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Journal of Applied Psychology

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This Journal gives prompt consideration to manuscripts reporting *original investigations* in any field of applied psychology except clinical and consulting psychology. A descriptive or theoretical article is occasionally accepted if it deals in a distinctive manner with a problem of applied psychology. The policy is, however, to favor papers dealing with quantitative investigations of direct value to psychologists working in the following fields: Vocational diagnosis and occupational guidance; educational diagnosis, prediction and guidance at the secondary school level and higher; personnel selection, training, placement, transfer and promotion in business, industry and government service including the armed forces; supervisory training in business, industry and government; illumination, ventilation and fatigue in industry; job analysis, description, classification and evaluation; measurement of morale of executives, supervisors, or employees; surveys of opinion on social or political issues, such as those conducted by The Psychological Corporation; psychological problems in market research and in advertising.

Articles may be under 500 words. The maximum is 16,000 words, the average in the neighborhood of 4,000 words. To reduce lag of publication, adherence to the rule of "brevity consistent with clarity" is encouraged.

A lapse of six to twelve months occurs between acceptance of an article and its publication, the lag varying with the rate at which manuscripts are submitted. If, however, an author is prepared to defray the costs of printing the necessary extra pages, he may arrange for earlier publication without thereby postponing the appearance of manuscripts by other contributors. This enables the management to provide space in addition to the scheduled 80 pages per issue. "Early publication" is thus a direct contribution to the subscribers. By cutting down lag in publication, it also benefits those authors whose articles are published in regular turn.

Tables, footnotes and references as well as text of manuscripts should be typed double-spaced throughout. Authors should adhere to the conventions described by J. E. Anderson and W. L. Valentine in "The preparation of articles for publication in the journals of the American Psychological Association," *Psychol. Bull.*, 1944, 41, 345-376. A reprint of this article will be loaned to any prospective contributor who does not find it in his library.

Journal of Applied Psychology

VOL. 33, NO. 5 OCTOBER, 1949

An Objective Analysis of Morale

William James Giese

William James Giese, Ph.D. and Associates, Chicago 3, Illinois

and

H. W. Ruter

Aldens, Inc., Chicago 7, Illinois

The profit and loss statement of a business is affected by that elusive thing called morale. Since most successful executives have recognized this, many companies have attempted to get a workable measure of the status of morale among their employees. The most successful of these attempts has been the morale survey through the use of a correctly dedigned questionnaire to measure the attitudes of the employees toward their supervision, working conditions, wage rates, chances for advancement, and similar important attitude areas. Although the results of such morale surveys are usually interesting to management (sometimes the results are even startling), the questionnaire method is cumbersome, costly, and slow. Also, because of its nature, the morale survey can be given successfully only at intervals of about once a year. This limitation, in addition to the costliness, often prevents the detection of an undesirable trend in morale when corrective action is easiest and most effective.

In addition to these very serious limitations, the morale survey becomes a row of question marks when a cost and savings analysis of it is made. The only answer to the question of costs is a general agreement among executives that poor morale costs the company money. But just how much money has not been determined, for there are no accounts in which poor morale shows up as an identifiable and cost accountable loss. As business moves into a more competitive era this question of costs and savings presents itself with an ever increasing urgency. If increasing the morale of the employees costs money, how much will be saved for every dollar spent? Is there a straight line relationship; that is, are the savings per dollar spent the same regardless of the amount spent? Where is the break-even point? At what point does the law of diminishing returns begin to operate?

After considering the above facts and questions along with their implications, the personnel manager [1] began to build an index based on objective records. After a number of conferences we organized a program of research that would give us some of the answers and tie the results directly to employee morale.

Purpose

Our primary purpose was to analyze the relationship of the objective records of departmental performances to morale as measured by the questionnaire method. Once these relationships are known, it is merely a mathematical problem to determine the best relative mathematical weights for each of the factors for the purpose of predicting morale.

In order to make certain that our basic records held promise of providing fundamental data for the prediction of morale, we first examined these factors as well as the morale score itself. Since the morale questionnaires were not scored but had only percentages of responses for each part of an item, it was necessary to make up a scoring system for the morale questionnaire.[2]

The first step was to learn if on the basis of our scoring there was an adequate range of difference between the departments in morale. Similar analyses were made for six factors [3] on which objective data were available in the personnel department and which appeared feasible for study to determine their prediction value in indicating departmental standings.

Our final purpose was to set up a simple method for the determination of departmental morale based upon factors each of which are cost accountable.

[1] H. W. Ruter, Personnel Manager of Aldens, Inc., 511 S. Paulina Street, Chicago 7, Illinois. Aldens is a national mail order company which retails by mail and through department stores all types of clothing, housewares, furniture, etc.

[2] The morale questionnaire was scored by giving the most unfavorable response to an item a value of 1, the second most unfavorable response a value of 2, and so on up to 6 for the most favorable response. Seventeen of the eighteen items in the questionnaire were amenable to this scoring system. The morale score was merely the total points for the seventeen items.

[3] The factors considered were: (a) Seasonal accumulated Departmental Production Efficiency; (b) Seasonal accumulated Departmental Error Efficiency, covering errors not affecting customers, i.e. errors in company handling which may delay the completion of the sale but are not otherwise noticeable to the customer; (c) Seasonal accumulated Departmental Error Efficiency, covering errors affecting customer such as items charged and omitted, wrong merchandise, size, color, etc. This type of error is most costly because of its injurious effect on customer relations, merchandise loss, etc.; (d) Annual labor turnover rate; (e) Seasonal accumulated tardiness percentage; and (f) Seasonal accumulated absence percentage.

The Results

The morale score gave an adequate separation between departments. In Figure 1, each square represents a department, and the number below the square is the average (arithmetical mean) morale score of the employees in the department.

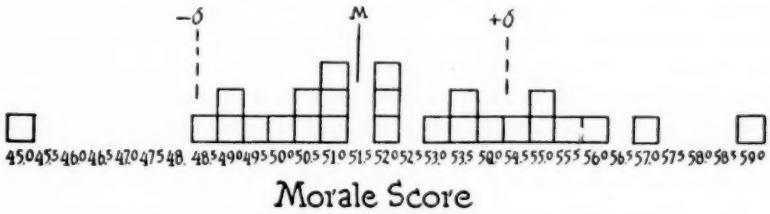

FIG. 1. Distribution of departmental morale scores.

In productive efficiency the mean of the departments varied from 80% to as high as 113%. This means that there are large enough differences between departments in their productive efficiency averages to use this factor in the correlation analysis. Figure 2 illustrates departmental differences in average productive efficiency.

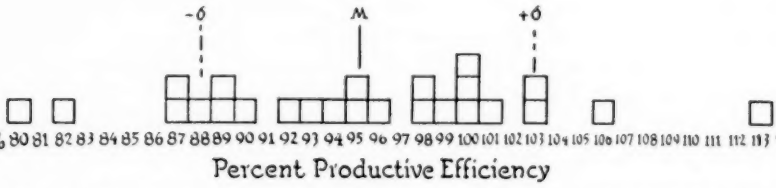

FIG. 2. Distribution of departmental averages on per cent productive efficiency.

For the remaining 5 factors the departmental differences are summarized in Table 1.

Table 1

Means and Standard Deviations of the Departmental Means for the Six Objective Factors used in the Analysis of Morale

Factor	Mean	S.D.
Per Cent Production Efficiency	95.64	7.43
Per Cent Error Efficiency Not Affecting Customers	78.41	20.85
Per Cent Error Efficiency Affecting Customers	61.60	17.00
Per Cent Turnover	222.70	80.02
Per Cent Late	9.67	2.87
Per Cent Absent	7.53	1.94

The present error efficiency **NOT** affecting customers has a cluster of departments averaging between 84% and 94% (14 out of 22) but due to the fact that the entire range is from 20% to 100% we kept this factor for correlational purposes.

The per cent error efficiency affecting customers shows a wide range of departmental performances and an even spread of differences throughout the range. Such a condition makes this factor a promising partial for the prediction of morale. Also, when the cost analysis is made of such errors, the potential savings due to reduction of these errors will in all probability be many times those possible with errors **NOT** affecting customers. The reason for this is that errors affecting customers are not only more costly but that there are only a few departments with a high efficiency standing.

The highest departmental labor turnover was 350% and the lowest 40%, almost a 9 to 1 ratio. The costliness of turnover can easily amount to a six or seven figure annual loss since the minimum loss per employee termination is $100.00. In addition, this factor for the purpose of predicting the morale standing of a department should be of great importance because of the large and even spread of departmental standings.

There are wide departmental differences in the per cent of the employees who are late. Here the range is from 3.5% to 14.5%; a ratio of well over 3 to 1. This factor also has an adequate spread and evenness throughout the spread for correlation analysis.

Since a department must carry more personnel to meet the work load demands if absenteeism is high, departmental variations in per cent absent were analyzed. The lowest was 3½% and the highest was 11%; a ratio of almost 3 to 1. The department which *averaged* 11% absent for the year had to carry at least 11% more employees to meet adequately the work demands placed upon it.

Table 2 shows the results of correlating each of the six factors with the morale score and with each other.

The two factors with the highest relationship to morale are per cent turnover and per cent absent. Both relate to morale with a fair *negative* relationship. When morale is low, absenteeism and turnover tend to be high.

Error efficiency affecting customers has a higher relationship with morale than does error efficiency **NOT** affecting customers. Most interesting is the low *negative* relationship between these two factors. That is, those departments with a high efficiency in errors affecting customers have a slight tendency to be low in errors **NOT** affecting customers. This difference could be accounted for on the basis of departmental emphasis on the importance between the two types of errors. There is a

slight *negative* relationship between morale and per cent late in a department. Since outside factors such as number of transfers made on public transportation, distance from place of work, weather, etc. probably have little or no relationship with morale but a fairly high one with lateness, this low relationship between morale and per cent late is to be expected. There is a slight relationship in the positive direction between morale and production efficiency, but it is much less important to morale than per cent turnover or per cent absent. This means that high morale is only

Table 2

Pearson Product-Moment Coefficients of Correlation between Objective Records of Departmental Performance and the Morale Score *

	0. Morale Score	1. % Productive Efficiency	2. % Error Efficiency **NOT** Affecting Customers	3. % Error Efficiency Affecting Customers	4. % Turnover	5. % Late
1. Per Cent (%) Productive Efficiency	+.19					
2. % Error Efficiency **NOT** Affecting Customers	+.15	−.50				
3. % Error Efficiency Affecting Customers	+.27	+.37	−.24			
4. % Turnover	−.42	−.18	+.05	−.25		
5. % Late	−.20	−.18	+.30	−.28	+.33	
6. % Absent	−.47	−.15	−.18	−.07	−.15	−.03

* The above correlations were computed from the averages of 25 departments. Therefore the scattergram was composed of 25 points. The total number of employees represented by the 25 points was 3000. The number of employees in the departments ranges from 14 to 405 with a mean of 120 and a sigma of 90.5. The correlation between the morale score and the number of employees in the department was −.07.

slightly related to per cent productive efficiency which makes it is entirely possible for a department to have a high standing from the standpoint of low direct unit costs, but it could have higher absenteeism, and turnover, as well as a tendency to greater errors. In such a department this initial unit cost efficiency should be readjusted (and it would be downward) because of the additional costs incurred due to the turnover, absenteeism, and correction of errors. The costs of turnover and absenteeism usually remain hidden in the various burden, administration, indirect, and similar

accounts. These costs do exist, and some departments waste much more money per employee than do others. Often a department can reduce its total unit costs more through concerted effort on these indirect costs than it can through merely increased output. However, such costs are usually spread on a per employee or per dollar of direct payroll basis so that the more efficient departments from the standpoint of these indirect charges have to carry the load of the more poorly run departments. Since such factors as turnover and absenteeism relate to both costs and morale, it should pay top management to reward those in charge of the departments who are able to hold these factors to a practical minimum.

Since the correlations between the six factors and morale tend to be somewhat higher than the correlations between all of the various factors, it paid to compute a multiple correlation. The multiple correlation was .71 which is high enough to warrant the use of these six factors for the construction of an objective morale index. Table 3 lists the Beta weights for each factor.

Table 3

Factor	Beta Weight
1. Per Cent Productive Efficiency	.0630
2. Per Cent Error Efficiency **NOT** Affecting Customers	.1674
3. Per Cent Error Efficiency Affecting Customers	.1227
4. Per Cent Turnover	.4348
5. Per Cent Late	.0758
6. Per Cent Absent	.4894
$R_{0.123456}$=.706	$r_{t.uvwxyz}$=.706

In order to check our calculations we multiplied each factor for each department by the Beta weight given in Table 3 and then added the six products for each department to arrive at an objective morale index. We correlated this objective morale index with the morale score and obtained .706 which is shown after $r_{t.uvwxyz}$ in Table 3.

Recommendations

Since this study has determined that there is an important relationship between morale and the combined factors of production efficiency, error efficiency, labor turnover, tardiness and absence it is recommended that the index of these factors be used as a determinant of the relative levels of morale in various operating departments. The Objective Morale Index is also a measure of supervisory effectiveness and may be used to supple-

ment or replace supervisory merit rating. Costing of the factors will enable management to measure the value of morale improvement efforts in each local situation.

Those departments falling into the lowest morale classifications should be carefully scrutinized to determine whether or not the problem is department-wide or if it is limited to certain activities or working units. Examination of the index factors of each group will determine this. When low morale has been localized as much as possible a diagnostic investigation should be conducted to determine causes. Corrective action is then to be applied where it is needed.

Another questionnaire survey should be undertaken to secure data for a re-validation of the Objective Morale Index. Thereafter the questionnaire survey need be used only at longer intervals and not so much for morale measurement as for obtaining information for the diagnostic investigations.

Summary

The purpose of this study was to predict the morale of departments from objective data. A morale questionnaire was scored so that a quantitative score was available. The six objective factors of per cent productive efficiency, per cent error efficiency **NOT** affecting customers, per cent errors efficiency affecting customers, per cent turnover, per cent late, and per cent absent were intercorrelated and correlated with the departmental morale score. The multiple correlation between these 6 factors and morale was .71.

Since the six factors are objective and in most cases cost accountable their use for morale measurement is not only practical, but meaningful to operating executives in business and industry.

The relative weightings for the six factors for the prediction of morale are probably specific to this particular business. Therefore, a similar analysis must be made before this method of morale measurement can be applied to other businesses or industries.

Since the economic milieu may have some effect on the relative weights of the factors, a study is now in progress to revalidate the Objective Morale Index.

Received March 28, 1949.
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Implementing an Employee Opinion Survey

Major Fred E. Holdrege, Jr., USAF

Air Materiel Command, Dayton, Ohio

The problem of securing whole-hearted support from supervisors and employees is basic to the proper conduct and "follow-through" of an employee opinion survey. It is believed that many readers of the *Journal of Applied Psychology* will be interested in the information used to implement the Air Materiel Command's 1948 survey of the opinions of approximately 80,000 civil service workers employed at its eight major bases located in various parts of the country.

The survey itself was listed as a "Survey of Employment Conditions" in a covering letter which accompanied the opinion questionnaire itself. The letter is as follows:

Subject: Survey of Employment Conditions
To: Civilian Employees of the Air Materiel Command

1. To provide an opportunity for you to express your sentiments regarding personnel policies and practices which affect yourself and your employment with the Air Materiel Command, I have directed the Chief, Personnel and Administration Department, this Headquarters, to conduct a survey by means of the inclosed questionnaire.

2. It is my hope that this survey will reveal any existing difficulties and discrepancies which will be corrected for the benefit of all employees by the proper application of personnel management techniques.

3. You can help to make this survey a success by basing your reply to each question on an honest estimate of your views as to the manner in which the AMC is operated, considering, of course, the restrictions imposed upon us by Department of the Air Force, Civil Service directives, and other legal restrictions.

J. T. McNarney
General, USAF
Commanding

Instructions for filling out the questionnaire as printed on the opinion questionnaire were as follows:

How I Feel About My Job
(A Survey of Civilian Employee Attitudes)

You are asked to answer this questionnaire as a part of a survey of civilian employee opinions and attitudes which is being made by the Personnel Analysis Office, Headquarters, Air Materiel Command. The purpose of this survey is to find out how our employees feel about their work and the conditions under which they work, so that sound plans for improvement can be made.

This is not a "test." There are no right or wrong answers. Just answer the questions in the way you, yourself, feel about them. That is the only correct answer.

Instructions

Read each question or statement carefully to make sure you understand it before marking your answer. If you have any questions raise your hand.

Mark only one answer to each question. If you have more to say, write it on the last page of this questionnaire, but first mark one of the suggested answers which most clearly expresses your opinion.

Before turning in your questionnaire, check to make sure you have answered every question.

Be completely honest in your answers. That is the only way you can make this survey helpful to yourself and to the Command.

Do not write your name on the questionnaire.

Important: This questionnaire must be returned before you leave the room.

The questionnaire itself was 24 pages long containing a total of 146 items calling for multiple choice checking of answers and open-end answers as well as a page for making further remarks if desired. The contents may be classified as follows: Part 1, My Job, 25 questions; Part II, Personal History, 8 questions; Part III, Job Relations, 29 questions; Part IV, Supervision, 29 questions; Part V, Training, 10 questions; Part VI, Employee Relations, 18 questions; Part VII, Employee Welfare and Services, 13 questions; and Part VIII, Working Conditions, 14 questions.

The responses were punched into IBM cards and a detailed statistical report was prepared for each installation, copies being sent to the Commanding officers of each installation. Each report was accompanied by a Foreword designed to secure maximum attention and maximum action on the findings. The Foreword is as follows:

1. *Purpose:* This final report has been prepared to facilitate ready comparison of the findings at your installation with that of the Command average on the results of the employee opinion survey conducted at major AMC installations, March–April 1948.

2. *Value:*

a. In the final analysis, the value to be derived from this opinion survey depends upon whether management is psychologically prepared to translate the findings of the survey into action. Without action, the survey is merely a scrap of paper. With action, the survey becomes an effective means to an end . . . that of improved Command operational teamwork and economy.

b. It has been found that top management is too often inclined to take action only on incidental or secondary findings of such surveys . . . ignoring the more important revelations. In some instances, top management is merely content to learn that the morale of its organization is no worse than that of others.

c. Naturally, there is a defensive reaction on the part of operating officials to adverse disclosures brought about through morale or opinion surveys due to the interpretation of these disclosures as a reflection upon their ability. Hence, there is a tendency toward unwarranted discounting of survey data and a closing of the mind to self-analysis.

d. An objective viewpoint rather than a justification attitude must be taken if the results anticipated are to be gained.

3. *Employee Opinion:*

a. In reviewing the graphs and tabulations in this booklet, it is extremely important to bear in mind that these opinions of your employees are based on either (1) *factual conditions*, or (2) upon *erroneous impressions*. Whichever is the case, the only satisfactory solution lies in prompt remedial action.

b. It is also realized that adverse comment by employees with respect to a particular activity is not necessarily indicative of an activity poorly administered. It may be that from management's standpoint the activity is an efficient one. Whichever is the case, is of minor consequence; adverse employee opinion on any particular activity is a danger signal that management cannot afford to ignore. It is a sympton that calls for diagnosis and treatment.

c. If adverse opinions are based on factual conditions, then corrective action with respect to these conditions seems the only logical solution. If, on the other hand, unfavorable opinions expressed by employees are based upon erroneous impressions or information, then action should be taken to bring the true facts to the attention of employees so that they may be more thoroughly and accurately informed.

4. *Comparative Charts:* A Command comparison of the nature presented herein naturally places emphasis upon deviations from the average of the Command. These deviations are important, of course, but other aspects of the graphs must not be entirely disregarded. For example, matching or equaling the Command average is not necessarily indicative of a satisfactory condition for the reason that the Command average may reflect a condition unfavorable throughout the entire Command. Then too, it should be pointed out that the Command average is a composite picture of all installations and that a proportion of the installations must necessarily fall above the Command average.

5. *Chart Interpretation:* In order to assist you in interpreting the charts, recommendations have been made on the survey questions which show a significant variation from the Command average. While such recommendations naturally cannot be as accurate as on-the-spot observations, they are a composite of the thinking of various AMC Headquarters' organizations coupled with observations derived from the questionnaires themselves.

6. *Assistance:*

a. In order to assist those installations which fell below the average of the Command on various questions, names of the installations which presented the most favorable picture have been set forth in the final section of this report. Installations below the Command average are urged to contact these "high" installations for suggestions as to possible means of improvement. Liaison with these installations, leading the Command in methods and procedures used, is encouraged. An exchange of ideas is certainly one source of self improvement.

b. If assistance of the Hq Personnel Analysis Office is desired with respect to any morale or employee attitude problem, a brief statement of the problem should be forwarded to this Hq, Attention MCAA. If conditions warrant, an on-the-spot analysis will be made.

7. *Data:*

a. It should be remembered that the data secured in the conduct of this survey represent the first tangible information available to management as to what employees think of Command management and operations. Management can estimate, have a fairly good idea, or may be quite certain it knows pretty well how employees think . . . but up until the time of the survey this has been but a guess.

b. Management's opinion of Command operations, on the other hand, is fairly well-informed through the media of Inspector General reports, liaison between Command officials, Comptroller reports, etc. You might ask, "Just how important is it for management to have a thorough understanding of employee opinion?" Actually, having this one understanding is an absolute prerequisite to successful management. Management cannot afford to forget that "Management is the development of people and not the direction of things." Every policy that is written, every plan that is developed, every decision that is made, and every activity that is initiated must be considered in terms of the capacity of people to make them successful.

8. *The Employee:*

a. This seems an appropriate place to call attention to the one fellow who may be overlooked in follow-up of the questionnaire . . . and that is the employee who volunteered the information. He has a right to expect management to inform him of any action taken on the information he supplied. Correspondence reaching this Headquarters indicates that there is still much to be desired from an employee standpoint as to action being taken. It is realized that some adverse situations cannot be solved over night, nor even in months, yet unless the individual employee is acquainted with steps being taken or under consideration, he is likely to jump at the conclusion that his opinion is not even being considered. The failure of management to "keep faith" will nullify any further attempts to gain the cooperation of employees.

b. It cannot be over emphasized that employees must be informed of what is being done. They fulfilled their part of the contract by giving their honest opinion and suggestions for the improvement of working conditions. In General McNarney's letter to each employee, it was pointed out that adverse situations revealed by the survey would be corrected for the benefit of all employees. Thus, information on questionnaire follow-up action must be passed on to employees if the management-employee relationship is to remain unimpaired. Various media can be used to inform employees, such as notices, articles in the installation newspaper, supervisors' meetings, etc.

9. *Action Taken:* This Headquarters would also like to know of action taken on survey results. Communications should be addressed to the attention of the Personnel Analysis Office (MCAA). An analysis of follow-up action will be made and those steps which appear applicable to other field installations will be disseminated for the information and assistance of all.

10. *Results to be Expected:*[1] When results of the morale survey are properly accepted and acted upon, the following benefits may be expected:

a. The possibility of a permanently higher level of employee morale and productivity brought about by concrete change in conditions, practices, and policies.

b. The improved morale brought about by the very administration of the survey itself. Most surveys bring about immediate morale gains based upon the employees' discovery that management is really concerned about their feelings. When changes are initiated as a result of employees' opinion and it is made known to them that their feelings have caused the change, they will feel that they have some part in the determination of management policies. If expected changes are not forthcoming or long delayed, the temporary boost in morale is soon lost as a result of employee disillusionment and frustration.

c. The opportunity to increase the understanding of management employee

[1] *Making the Most of Morale Surveys* by F. F. Bradshaw and Herbert E. Krugman of Richardson, Bellows, Henry and Company, Inc.

problems by experimenting with new policies on a small scale or by intensively studying problems raised by the survey.

d. If action is taken as a result of an initial survey, employees will be more voluble in their replies to questions on which they are asked to comment in future surveys; hence, more effective results can be obtained from these questions on which employees are asked to comment.

e. An opportunity to commit the organization to a permanent goal of ever-rising morale levels which can be measured through the means of annual morale surveys.

In addition to the Foreword each report also contained two sample letters together with a suggestion as to how they might best be used. The suggestion for the preparation and use of the follow-up letters is as follows:

Sample Letters of Employee Opinion Follow-Up

As an illustration of one means of following-up on the opinion survey, the following pages contain two suggested survey action letters which may be easily adapted to the local situation by Commanding Generals of the various Air Materiel Areas.

One is a letter to all employees acquainting them with remedial action taken on adverse survey disclosures; the other a letter to all supervisors pointing out supervisory functions in need of improvement.

The first sample letter intended for employees is as follows:

Headquarters
Air Materiel Area

To all employees:

I would like very much to be able to talk with you individually to obtain your attitudes and opinions concerning the conditions under which you work each day. Since this is not possible, I welcomed the opportunity to have the AMC employee opinion survey conducted at this Headquarters. This appraisal of all phases of your work is of particular interest to me as an effective means for improving working conditions, morale, job satisfaction, and work simplification.

In view of the time involved in determining the practicability of making suggested changes and the planning and working out of necessary readjustments, many of the improvements which you have proposed cannot be put into effect immediately. However, the following action has already been taken as a result of your suggestions:

1. Exhaust fans have been installed in the aircraft repair shop.
2. Fluorescent bulbs have been provided for all light fixtures in the instrument repair shop.
3. Equipment and tools in the repair shops have been rearranged to eliminate blocking of exits.

The following projects are presently being given special consideration:

1. Survey of the procurement and routing of parts to expedite delivery.
2. Plan for improving parking facilities and improving traffic controls.
3. Survey of the wage scales in this locality with the intent of adjusting prevailing pay rates and publishing for employee information an approved wage schedule.

I desire to express my appreciation of the many opinions and comments submitted. It is my hope that any unfavorable situations will be corrected to the greatest extent

possible. Our combined efforts to improve working conditions and promote good relations will provide all of us with a still better place in which to work.

.....

.....

Commanding General

The second sample letter intended for supervisors is as follows:

Headquarters
Air Materiel Area

To all supervisors:

An impartial analysis of the AMC employee opinion survey encompassing every phase of our work activity, has afforded me a wealth of information that I have accepted as an accurate diagnosis of our "state of health." We, as management, must assume the responsibility for the unfavorable conditions in our personnel relations as well as the favorable aspects presented by our people. However, *you* are management to the employee and the manner in which you execute the duties and responsibilities necessarily delegated to your position influences the employee's attitude toward his employment and the entire management program.

Supervisory training courses equip you with the fundamentals or principles of supervision but this knowledge alone is not enough to ensure effective practices. To attain skill in the art of supervising people, just as in playing golf or driving a car, requires diligent practice and broad experience in order to successfully cope with situations that do not fall into normal standard patterns. In addition to acquiring a knowledge of the basic principles of supervision and a degree of skill in supervising people, one must be able to identify and "think through" the elements of his job and then analyze his managerial practices objectively. As a result of such analysis you may decide that you are uncertain as to what your actual responsibilities are, or perhaps you do not have a thorough knowledge of pertinent rules and regulations or have unconsciously drifted into some poor habits of thinking and doing. The logical conclusion is the realization that you want to acquire more skill in supervising the people in your group. Having reached this conclusion, you are in the frame of mind to welcome ideas, information, and instruction that will help correct those phases of supervision in which you have rated yourself weak.

It is to this state of open-mindedness that I appeal in presenting to you now and in the future my philosophy of effective supervision and personnel relations practices. You are not expected to accomplish this analysis or program for improvement alone but through the combined efforts of our management team we can strengthen our weaknesses.

In order to give you a background for this program, I have selected for brief discussion a few supervisory responsibilities that have been neglected to varying degrees.

1. A significant number of employees receive direct orders from two or more people. This practice is not only in violation of sound management principles, but evidence of indifference toward our organizational structure. All organization charts clearly define lines of authority and control and have been planned to ensure both work and employee efficiency at even the lowest levels of operation. When we permit these lines to become crossed or tangled, we are short-circuiting our work efficiency and inviting personnel problems.

2. Giving an employee the credit he deserves for doing a good job or making a good uggestion requires very little time and effort but has a tremendous effect on groups attitude. You have nothing to lose in giving credit or recognition for it is merely

passing on to another that which rightfully belongs to him. The practice of giving credit where and when it is due is one of the most impressive "tools" of supervision for the craving to be appreciated and recognized as an individual of worth is a universal human trait.

3. We are by nature creatures of habit. It is a natural tendency to resist changes or to discredit the changes that another has proposed. You must reach beyond this narrow view and welcome all suggestions intended to improve or streamline operation. Give each suggestion serious consideration; if it is not advisable to make the change, explain your reasons (which must be sound) to the employee. If the suggestion has merit and can be incorporated in the operation, give the employee credit for proposing it. The attitude you assume in the initial discussion of the suggestion and the manner in which you receive ideas will either make employees feel free to bring other ideas to you or discourage them from ever approaching you again. We must encourage constructive thinking. It was evidenced in the Survey analysis that employees want to be happy in their work—it is our responsibility to provide the opportunity.

4. It is my contention that at least half of the dissatisfaction and complaints can be attributed to erroneous information or to the lack of dissemination of information to employees. A good portion of the blame for this falls on our shoulders for many of the criticisms received concerned items which a good supervisor could answer. As an example, a surprising number of employees do not have a clear concept of the difference in the work performed by the Civilian Classification Branch and the Civilian Utilization Branch. These are two distinct personnel services and every employee at some time or another is influenced by decisions made by these Branches. This type of information should be common knowledge among employees. A supervisor who shares information stimulates a good group spirit and gives the individual an assurance of some prestige in the group.

It is you, the key men and women on the management team, who have been entrusted with the grave responsibility of effectively applying the principles of supervision. Clear your minds and thoughts of prejudices or selfish ambitions; be eager to accept new ideas and sound procedures. The degree of your cooperation will determine the success of our personnel program.

.....

.....

Commanding General

Information obtained from the survey has proven its value even beyond that originally anticipated. As a result of the questionnaire, various phases of the over-all "working conditions" picture have been subjected to re-evaluation in light of employee opinion.

Many improvements have been made. Of course, there are a number of situations which will require time and continuous remedial effort before some degree of satisfaction can be assumed. On those problems extremely complex, such as the proper utilization of skills and abilities, progress can be achieved only by constant surveillance and study. Then too, we must be extremely careful to insure the maintenance of standards on those practices most favorably rated by employees.

Plans are now going ahead for the conduct of the second command-wide survey. With the results of the first survey to serve as a basis for

comparison, it will be possible for the first time to measure improvement of existing policies and practices from an employee standpoint.

An attempt at a "one-shot" approach to achieve a "once-and-for-all" solution is being carefully avoided. Instead, the picture of the Command's operations as presented by employees will serve as a guide and a basis for the checking and development of a personnel program designed to achieve maximum accomplishment through our human resources.

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A Trade Test for Power Sewing Machine Operators

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The David Clark Company Inc., like many other garment factories, hires many power sewing machine operators throughout the year. The problem has been to reduce the turnover resulting from having to release unsatisfactory stitchers, and also to free foreladies from having to teach new employees how to operate a power sewing machine. In the past reliance was put on the statements of the applicants as to their skill and experience. This process frequently yielded poor workers and was expensive in turnover and foreladies' time.

The problem at David Clark Company Inc., a subsidiary of Munsingwear Inc., was to find out which of the numerous applicants claiming skill and experience could actually operate a power sewing machine on the lightweight cotton used in making brassieres and girdles.

Design and Sampling

In attempting to devise a trade test for stitchers pertinent previous work was carefully studied [1] and production line work was observed. The test that is now to be described is based on an hypothesis resulting from a combination of these two sources and validated on present employees. The four sections of the trade test as well as the trial sample were given to all of the power sewing machine operators in the plant. These operators were unselected as to level of skill or productivity except as experience itself is a selector. There were forty-nine operators, all female. Their experience ranged from two months to ten years and their productivity ranged from a barely acceptable amount of work to twice the acceptable amount of work.

The plan was to correlate the results of the trade test with the supervisors' ratings and production records. If validated, the trade test could then be used to classify applicants on a proficiency scale.

Criteria Selected

Supervisors' ratings were obtained from the two general supervisors of all of the operators. Both of these supervisors were qualified rate setters

[1] See especially: Otis, J. L., The prediction of success in power sewing machine operating. *J. appl. Psychol.*, 1938, **22**, 350–366. Blum, M. L., Selection of sewing machine operators. *J. appl. Psychol.*, 1943, **27**, 35–40.

and were experienced in evaluating the speed and quality of the operators' work. The ratings were obtained independently and before any test results were available. The speed and quality ratings were obtained for each worker and combined into an overall rating. The product moment correlation of the two supervisors' overall rating agreement was $+.87 \pm .035$. Each operator was rated on the following five point scales for speed and quality:

Speed Rating Scale	*Quality Rating Scale*
Very Fast Worker	Highest Quality Work
Faster Than Most	Quality Better Than Most
Average Speed Worker	Average Quality Work
Slower Than Most	Quality Poorer Than Most
Very Slow Worker	Very Poor Quality Work

Production records were obtained for a one year period in order to provide a further check on the trade test. The product moment correlation between these criteria was $+.83 \pm .043$.

The Trade Test

Trial Sample. The trial sample consisted of a single piece of lightweight nude cotton $5\frac{3}{4}''$ by $7\frac{3}{4}''$. The subject is instructed to stitch around the cloth approximately a quarter inch from the edge.

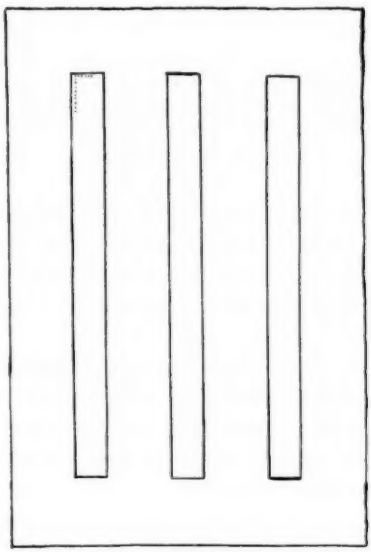

FIG. 1. Worksample 1.

1. *Bias Tape on Cotton.* The first worksample consisted of a piece of lightweight nude cotton 5½″ by 8½″ onto which three pieces of white cotton bias tape 6½″ by ½″ are to be sewed. The subject is instructed to sew these strips onto the cotton cloth as straight as possible and to space them as well as possible without a ruler.

2. *Hemming Material.* The second worksample consisted of a piece of lightweight nude cotton 5¾″ by 7¾″. The subject is instructed to sew a double lap hem into the material, turning a quarter inch under each time.

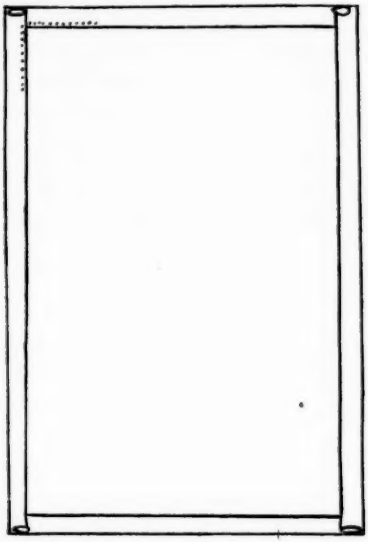

FIG. 2. Worksample 2.

3. *Stitching Between the Lines.* The third worksample consisted of a piece of medium thickness cardboard 5½″ by 8½″ with a double lined pattern to follow. The subject is instructed to follow the pattern drawn on the cardboard stitching without thread between the lines without going outside the lines.

4. *Stitching on the Line.*[2] The fourth worksample consisted of a piece of medium thickness cardboard (same as in worksample number three) 5½″ by 8½″ with a single lined pattern to follow. The subject is instructed to follow the pattern drawn on the cardboard stitching without thread and without going off the line.

[2] The seeming similarity of Worksample numbers three and four is only superficial for number four is actually much more difficult.

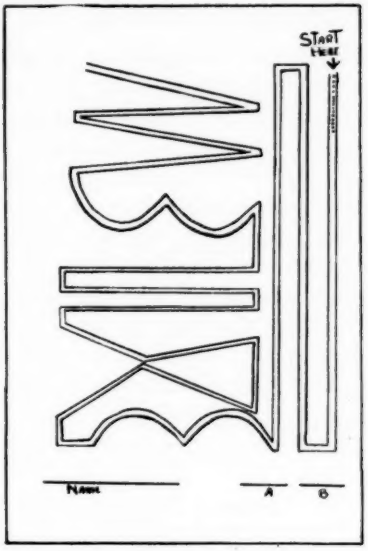

FIG. 3. Worksample 3.

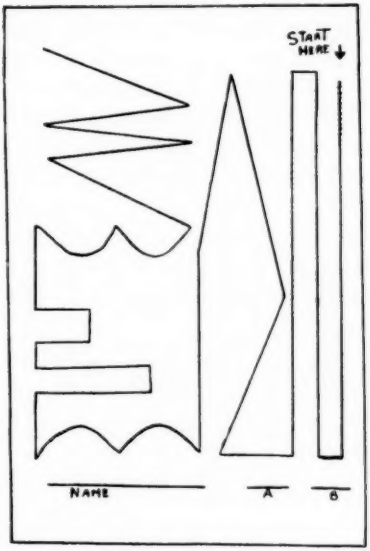

FIG. 4. Worksample 4.

Administration of the Test

The administration of the trade test is carried out by the use of shallow boxes lettered SAMPLE 1, 2, 3, 4. The material the subject is to sew with is placed inside the box along with an example done accurately and carefully so that the subject may see exactly what is to be done. Typewritten instructions on the inside bottom of the box tell the subject what to do. This method of utilizing both written and visual instruction insures that persons of all types may be tested accurately and also provides a uniform administration procedure.

The boxes are given to the subject one at a time and the administrator instructs the subject to do the task neatly and accurately, but also quickly. The same instructions are given to operators on the production line. The time of each operation is taken from the moment the box is placed on the sewing machine until the operator has trimmed the threads or until the machine is stopped on the cardboard.

Scoring the Test

The trade test is scored for both speed and quality and also for a combination of these which gives an overall (summed) stitching score.[3] Since each test is timed, the total time of each is added thus giving a speed score for the battery. The quality scoring is more complicated for many things must be taken into consideration. Worksample 1 and worksample 2 were scored by setting distance limits for each operation and by counting incorrect stitches. In number 1 placement, parrallelism, and evenness were measured objectively with a ruler and the incorrect stitches counted. Handling, folding, and stitching were scored in the same way in number 2. The time needed to complete number 2 was also figured in the quality score by adding to the score for quickness and lowering the score for slowness, for the better stitchers can fold and handle the material more skillfully than the poorer operators. The quality scoring of worksamples 3 and 4 was much simpler: the number of holes that were outside the lines in number 3 and the number of holes that did not touch in number 4 gave the quality score.

This scoring procedure is based on objective measurements and counting of stitches and thus can be carried on by others very easily.[4]

[3] The advisability of combining these separate and distinct ratings into an overall stitching score may be questioned since the two scores are more or less opposed to each other: that is, if the time or speed rating is high the quality rating is apt to be low and vice-versa. However, an accurate picture of the stitcher's ability cannot be obtained many times without combining these two scores because of the above fact. Of course, it must always be added that the overall score is made up of the quality and speed rating.

[4] The norms developed for this trade test, as well as the scoring method, are available for use, but local norms should be developed by industrial users.

Results

These results are clearly significant. The supervisors' ratings yielded higher correlations probably because the supervisors knew the operators' work and could correct for the distortion that appeared in the production records as explained in the footnote to Table 1. The two sets of correla-

Table 1

Trade Test and Criteria Correlations

	Correlations	Standard Error
1. Trade Test and Supervisors' Ratings:		
Speed Scores	.58	±.095
Quality Scores	.55	±.099
Overall Scores (Summed)	.64	±.084
2. Trade Test and Production Records:		
Speed Scores	.56	±.097
Quality Scores	.31	±.129
Overall Scores (Summed)	.53	±.103
3. Trade Test and Combined Criteria:*		
Overall Scores and Combined Criteria (Summed)	.67	±.078

* Combined by means of Z scores and also weighted in a 2–1 ratio, supervisors' ratings to production records. This is because many operators of only mediocre skill become accustomed to a single task and accumulate rather high earnings over a period of time. This may also explain the somewhat lower correlations obtained with production records.

tions and the combined criteria correlation do establish the trade test as an instrument that will differentiate between the more highly skilled and productive operators and the poorer and less productive operators.

Summary

The trade test for power sewing machine operators provides a method by which the more highly skilled and productive operators may be differentiated from the less skilled and less productive operators.

Such a test should be useful in selecting applicants who have the skills needed in production and who, consequently will require a minimum of on-the-job training.

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Prediction of Job Success from the Application Blank

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While considerable factual information is contained on the typical industrial personnel application blank, little information is now available to indicate the actual value of this information for predicting the probable job success of the applicant. This study attempts to make a small contribution to existing knowledge on this topic by obtaining correlations between success on the job and such information items as sex, marital status, possession of telephone, street address (i.e. part of city), age, birthplace (in or out of state), children, dependents, height, weight, previous employment with company, insurance, recent illness or operations, number of personal references listed, organizations, hobbies, company acquaintances, education, and previous positions for 244 employees in the personnel, engineering, purchasing, production control, phonograph record manufacturing, electronic tube manufacturing, and warehouse departments of the Indianapolis plant of the RCA Victor Division of Radio Corporation of America.

Success on the job measures for these 244 employees were obtained from supervisors and the raw merit ratings (split half reliability of the merit rating form was found to be above .75) from each supervisor were transformed into standard dichotomous scores which were then plotted with the information items to obtain tetrachoric coefficients of correlation between job success and these variables. These are presented in Table 1. Correlations significant at the five percent level or better are set in boldface type.

On the basis of the highest correlations, eleven items were scored, check-list fashion, and the total scores were correlated with job success to obtain a coefficient of $.35 \pm .04$.

Although all these findings should be accepted as tentative, it is possible that some of the findings may be found to apply to most departments of work in general industry. Analysis of item predictive value for various types of work was not attempted here because of the limited number of cases.

Marital status has the greatest relationship with the criterion for these cases. Area B street address correlates positively with job success while Area A address correlates negatively; this is regarded as surprising since the large area of above-average socioeconomic status in the city is in Area A. Number of children and number of dependents, while regarded as important by most personnel workers for obvious social reasons, do not correlate significantly with job success. Height and weight seem to be of little general predictive value, although obesity tends to be a definite

Table 1

Correlations between Job Success Ratings and Personal History Items

Female sex	−.16
Marital status: single	−.18
married	.30
divorced	−.05
Telephone number (possession of)	.07
Street address: Area A	−.22
Area B	.23
Area C	.15
Area D	−.11
Age	.08
Birthplace (in same state as plant)	.15
Number of children	.00
Number of dependents	.00
Height of males	−.12
Height of females	.05
Weight of males	−.27
Former employee of same company	.22
Holds insurance policy	.06
Recent illness or operation	.00
Number of personal references listed	−.17
Number of organizations in which membership is held	.23
Number of hobbies	−.18
Number of company acquaintances	−.09
Education: special training	.15
college	−.01
Number of previous positions	−.22

handicap for men. Former employment in the company seems to be an asset, but possession of insurance and recent illness or operation appear relatively unrelated. Listing of an excessive number of personal references, hobbies, or previous positions is negatively related with the criterion, but membership in organizations and special education are positively related.

It should be emphasized that these correlations are low and the findings possibly may apply only to the workers measured. Nevertheless, it is interesting to note that approximately ten per cent of the variance

in job success of these 244 employees is accounted for by "autobiographical" factors reported in the original applications for employment. Such check-list autobiographical scores may make a highly useful addition to the total predictive test battery. Naturally they should not be weighted more heavily in determining selection than their relative contribution to determination of job success variance indicates. In order to maintain the validity of the autobiographical scoring key, it should be revised periodically according to results of routine revalidations.

Better results may be obtained in selecting for a specific job with this device than when using it to hire for the entire plant. Manson (**1**), for example, found a coefficient of correlation of .40 between the weighted scores on an application blank and the production records of life insurance salesmen, and Ohmann (**2**) obtained a correlation of .67 between his blank and the earnings of paint salesmen.

Summary

1. Most of the items on a typical industrial personnel application blank are easily quantified in check-list fashion on the basis of a previous item validation study against a job success criterion.

2. In this study, when the original applications of 244 employees were scored check-list (unweighted) fashion with a validated key, the check-list raw scores were found to correlate .35 with the supervisory merit ratings of job success.

3. Since in this study the application blank accounts for approximately ten per cent of the variance in job success of an extremely heterogeneous (almost "run of the employment office") group of employees, it seems reasonable that the application blank or a systematic autobiographical inventory should become a standard part of the psychometric battery in industry.

4. In view of the facts that background factors change in predictive significance with time and their significance also is altered by changes in the business cycle, the industrial psychologist should revalidate such an instrument periodically.

5. When validation keys are developed for specific kinds of employees or job families, more substantial correlations are likely to be obtained both with the job success criterion and the tenure criterion.

Received January 12, 1949.

References

1. Manson, G. E. What the application blank can tell. *J. Personnel Res.*, 1925, **4**, 1–28.

2. Ohmann, O. A. A report on selection of salesmen at the Tremco Manufacturing Company. *J. appl. Psychol.*, 1941, **25**, 18–29.

Tests Used by United States Air Carriers

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The use of tests in the selection and promotion of employees is coming into increasing favor with United States industry. The first marked interest in such tests resulted from their use by the United States Army in World War I. The extensive and successful use of tests by our armed forces in World War II has given added impetus to the use of tests in industry. In some areas personnel testing has aroused an almost phenomenal interest among business executives.

A survey of the various psychological tests used by United States Air Carriers (Scheduled and Certificated) is provided by the results of a questionnaire received from 24 companies. Cooperation in replying to the questionnaire was very gratifying and personnel directors of many of the companies indicated they would like to receive a copy of the results: A questionnaire was sent on July 14, 1948, to all companies listed [1] asking the personnel director of each company to indicate which tests were most useful in selecting and promoting personnel within his company.

Of the 24 companies that returned questionnaires 13 indicated extensive use of tests, 2 use tests only to select pilots, 2 stated they had not begun operation, 1 disclosed tests were not used and would not be used until there are at least ten applicants per job, and 6 indicated they were small organizations, hence depended upon the ability of management to determine the qualifications of those seeking employment. However, they have felt the need of using more scientific methods.

The questionnaire listed 50 tests selected from the article published by Louttit and Browne.[2] The tests were chosen on the basis of published reports pertaining to the validity and reliability of each. Further evidence of suitability based on the author's use of the tests and the comments found in Buros' book.[3]

[1] American Aviation Directory, Spring–Summer 1947, American Aviation Publication, Washington, D. C. It lists thirty-six companies; however, five are operated by companies included in the mentioned list.

[2] Louttit, C. M., and Browne, C. G. The use of psychometric instruments in psychological clinics. *J. consult. Psychol.*, 1947, **11**, 49–54.

[3] Buros, O. K. *The Nineteen Forty mental measurements yearbook.* Highland Park, New Jersey, The Mental Measurements Yearbook, 1941.

Table 1

Tests Reported as Being Used Most Often

Type and Name of Test	Number of Times Listed
General Ability	
American Council on Education	1
California Job Test	1
x General Aptitude	1
Ohio State University Psychological Test	1
Otis, Self-Administering	10
Personnel (Wonderlic)	6
Wechsler-Bellevue	1
Achievement	
x Arithmetic	1
Nelson Denny Reading	1
x Special Knowledge	1
Mechanical Ability	
Bennett, Mechanical Comprehension	5
MacQuarrie, Mechanical Ability	1
x Manual Dexterity	1
x Master Mechanic	1
x Mathematics-Physic	1
x Mechanical Comprehensive	1
Minnesota, Mechanical Assembly	1
Minnesota, Paper Form Board	3
O'Connor, Wiggly Block	1
x Second Officer Selection	1
Stenquist, Mechanical Aptitude	3
x Technical Information	1
x Trade Test	1
Clerical	
x Filing	1
Gregg Stenography	2
Gregg Typing	2
Minnesota, Vocational Test for Clerical Workers	3
Thurstone, Examination in Clerical Work	2
x Stenography	4
x Typing	4
Special	
Vision Test Administered by a Physician	1
Interest	
Kuder, Preference Record	3
x Mechanical	1
Strong, Vocational	1
Personality	
Humm-Wadsworth Temperament	3
x Memory Test	4
Minnesota Multiphasic Personality Inventory	6

Code: x = Self Developed Test.

Only those tests reported as being used are listed. See Table 1. Blank spaces were provided on the questionnaire and the personnel director was asked to list such tests in use by his company which did not appear on my questionnaire. This instruction produced a rather lengthy list of additional tests. Other instructions on the questionnaire were as follows:

How long have you used tests?

If you have used any tests and have abandoned the practice, will you please name the test.

For the selection or promotion of what types of employees have you used tests?

Who administers your test selection and administration program?

Table 2

Type of Employees Selected or Promoted by Tests

Type of Employees	Number of Times Listed
Apprentice	8
Semi-skilled workers	7
Salesmen	6
Clerical employees	10
Unskilled workers	5
Navigators	1
Skilled workers	8
Pilots	8
Foremen and/or supervisors	6
Executives	2
Sales agents	1
Flight engineers	1
Stewardess	2

An examination of the results in Table 1 indicates that the standardized tests used most frequently are the Otis, Self Administering, Personnel (Wonderlic), Minnesota Multiphasic Personality Inventory, Humm-Wadsworth Temperament, Bennett Mechanical Comprehension, Minnesota Clerical Aptitude Test, Stenquist Mechanical Aptitude, and Minnesota Paper Form Board. The self developed tests listed most often are typing, stenography, and memory test. Practically all companies reporting administer an intelligence test and also a clerical test.

Table 2 lists the type of employees selected or promoted by use of tests. To date, little use is made of tests to select or promote sales agents. In general tests are used mostly to select office clerks, pilots, apprentices, skilled workers, and semi-skilled workers.

The survey discloses that a few companies inaugurated testing only two years ago, while others reported having used tests to select and promote personnel for the last ten years. It is interesting to learn from the questionnaire that no company discontinued administering tests permanently once it began to use them.

In replying to the question who administers your test selection and administration program? Six listed the employment manager, four delegated the assignment to the personnel clerk, three indicated the responsibility was assumed by the personnel manager, and one stated a clinical psychologist is employed full time to administer tests.

Perhaps the most interesting implication of this survey is that in general all air carrier companies are either using tests or have felt the need of using scientific methods for selecting and promoting personnel. Of equal significance is the fact that once a company inaugurated a testing program it was never halted permanently by management. The various company's interest in tests is evidenced by the use of a diversity and variety of not only well known standardized psychological tests but also company developed tests.

In general, companies reported using tests that have been found to be valid and reliable.

It would be gratifying to flight passengers to learn that the survey disclosed psychological instruments were used most often, in addition to selecting clerical employees, to select personnel definitely responsible for the maintenance and the flight operation of the airplane.

Received February 18, 1949.

A Factor Study of Worker Characteristics *

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In order to make the relationships between occupations more understandable, the Occupational Analysis Division of the United States Employment Service has selected the most significant job characteristics, and assembled them into a rating form adapted after Viteles' Job Psychograph (**15**, **16**). This rating form has been applied to several thousand occupations. Estimates of the most significant worker characteristics required for each occupation are made independently by several trained analysts. If, for example, an assembly job demands an unusual amount of finger dexterity, the analyst indicates that dexterity of fingers is an important worker characteristic for this occupation. This information is punched on Speed Sort cards, which can then be sorted so that the occupations which have various characteristics in common can be studied and the relationship between them noted. The traits included in the Worker Characteristics Form are listed in Table 1.

The Worker Characteristics Form includes 45 traits or abilities which may be needed by the worker to do the job. A large number of important "Job Families," containing lists of occupations related to a single occupation or to a limited number of selected occupations, have been established on the basis of worker characteristics. These have had various uses: to select workers for critical occupations from related occupations; to transfer workers from occupations in which there were labor surpluses; to upgrade employees on the job; and, to show the civilian occupations related to military occupations (**8**, p. 703). Nevertheless, it is obvious that the usefulness of the Form for some purposes would be increased if it contained a smaller number of independent traits. This pilot study was undertaken to determine what basic factors were being measured

* This paper is an abridgment of a master's thesis completed at the George Washington University in 1944 under Dr. Thelma Hunt, chairman of the thesis committee. The study was done in 1943–44 when the author was on the staff of the Occupational Analysis Division of the United States Employment Service (then a part of the War Manpower Commission). Acknowledgment is made to Dr. Carroll L. Shartle (now at Ohio State University) and Dr. Beatrice J. Dvorak for permission to use data in the files of the Occupational Analysis Division of the United States Employment Service; and to the George Washington University and the United States Employment Service for permitting publication of this study. Acknowledgment is also made to Dr. Marion W. Richardson for having proposed the study.

Table 1

Proportional Frequency with Which Traits in the Worker Characteristics Form Are Rated as Required in Significant Degree in 275 Selected Occupations in the Skilled, Semiskilled, and Unskilled Categories of Occupations

	Characteristic Required of Worker	Per Cent
1.*	Work rapidly for long periods	17
2.*	Strength of hands	37
3.*	Strength of arms	47
4.*	Strength of back	27
5.*	Strength of legs	11
6.*	Dexterity of fingers	24
7.*	Dexterity of hands and arms	48
8.	Dexterity of foot and leg	05
9.*	Eye-hand coordination	52
10.	Foot-hand-eye coordination	05
11.*	Coordination of independent movements of both hands	11
12.*	Estimate size of objects	11
13.	Estimate quantity of objects	06
14.*	Perceive form of objects	21
15.	Estimate speed of moving objects	04
16.*	Keenness of vision	25
17.	Keenness of hearing	01
18.	Sense of smell	01
19.	Sense of taste	**
20.	Touch discrimination	07
21.*	"Muscular" discrimination	15
22.*	Memory for details (things)	16
23.	Memory for ideas (abstract)	04
24.	Memory for oral directions	04
25.	Memory for written directions	02
26.	Arithmetic computation	04
27.*	Intelligence	09
28.	Adaptability	04
29.	Ability to make decisions	08
30.	Ability to plan	08
31.	Initiative	05
32.*	Understanding of mechanical devices	15
33.*	Attention to many items	16
34.	Oral expression	01
35.	Skill in written expression	**
36.	Tact in dealing with people	04
37.	Memory of names and persons	**
38.	Personal appearance	01
39.	Concentration amidst distractions	03
40.	Emotional stability	05

Table 1 (*Continued*)

	Characteristic Required of Worker	Per Cent
41.*	Work under hazardous conditions	24
42.*	Estimate quality of objects	09
43.*	Work under unpleasant physical conditions	29
44.	Color discrimination	07
45.	Ability to meet and deal with public	02
	Added Characteristics	
46.*	Tools used	68
47.*	Knowledge of graphic instructions required	17

		Per Cent
* Skill Level:	Skilled	38
	Semiskilled	41
	Unskilled	21

* Characteristics which are included in this study.
** Less than one per cent.

by the Worker Characteristics Form. As it developed, only 20 of the 45 traits included in the Form were included in this study, so the factors discovered have reference only to these 20 traits and not to the Form as a whole. However, this is not a serious restriction, as none of the remaining 25 traits was present in significant amount in as many as 10% of a sample of the occupations so far studied.

Description of the Data

The Worker Characteristics Form provides for estimates of 45 traits, in an A, B, C, or 0 amount. The amounts designated by these letters are (**10**, p. 176–178): A. A very great amount of the trait, such as would be possessed by not more than 2 per cent of the general population; B. A distinctly above-average amount of the trait, less than that designated by A but more than that designated by C; C. An amount of the trait less than that possessed by the highest 30 per cent of the general population; and 0. The trait is not required for the job.

The analyst is instructed to compare the worker on the job with people in general, outside the plant and even outside the industry. The estimates are based on the abilities demanded by the job, not the abilities which the worker under observation happens to have. If the analyst is in doubt between an A or a B amount, he is instructed to rate the characteristic as B; if he is in doubt between a B or a C amount, he is supposed to rate the characteristic as B; and if he is in doubt between a C or an O amount, his instructions are to rate the characteristic as C (**3**, p. 2). In this way, the significant characteristics of the job are not submerged in the C column but are focused more clearly in the B column; A amounts of a trait are very definitely indicated; and traits which are necessary though in a small degree are not lost in the O column.

The analyst is guided in his understanding of the meaning of the traits by a manual embodying comprehensive definitions of the traits and examples of the different quantities of each trait (**3**). Several, usually ten, separate estimates are submitted by as many trained analysts who make their observations and estimates in different plants and states. The reliability of these estimates is not known, at least by the present writer. The information is collated by an analyst at headquarters, and reviewed by an analyst of higher grade. The final ratings are punched on Speed Sort cards, one for each occupation, in two amounts: A or B on the one hand, for traits which are present in significant amounts, and C or O, on the other, for traits which are not present in significant amounts. The frequency with which these traits were rated as significant in the study sample is shown (expressed in percentages) in Table 1.

About 9000 Speed Sort cards have been punched up to 1943. All kinds of jobs are included: professional, managerial, technical, service, sales, clerical, agricultural, skilled, semiskilled, and unskilled occupations. The present study has been restricted to the categories of skilled, semiskilled, and unskilled occupations.

The Speed Sort cards are arranged in sequence by occupational code. The skilled occupations are the 4–00 to 5–99 series; the semiskilled are the 6–00 to 7–99 series; and the unskilled are the 8–00 to 9–99 series. Two cards were selected at random from each centile group from 4–00 to 9–99. This would have yielded 1200 cards if the file had had sufficient cards in each centile code; but in many cases a centile code was open, or no studies had been conducted of occupations within the centile code, or only one study had been conducted, in which case only one card was selected. Two hundred and seventy-five Speed Sort cards were selected in this fashion from about 7500.

The occupational codes represent different occupations, and no account is taken of the relative number of workers in each occupation. Skilled jobs are more finely differentiated than unskilled jobs. There is a certain bias in the occupations selected by the United States Employment Service for study; the cooperativeness of the different industries, and the matter of geography, are only a few of the variable factors. No one knows how representative the 7500 Speed Sort cards are of skilled, semiskilled, and unskilled occupations in the United States. The 275 study occupations may be charitably regarded as a sample of the classification structure of a major part of the Dictionary of Occupational Titles (**14**).

Procedure

Obtaining the Correlations. Since each characteristic, as punched on the Speed Sort cards, was either present or not present, it was feasible to compute only tetrachoric correlation coefficients between pairs of characteristics. Thurstone recommends that the coefficient not be computed at all if one of the tail areas is less than 10 per cent of the total population (**1**). Consequently, all characteristics which were significantly present in less than 10 per cent, approximately, of the sample of jobs in the present study were eliminated, since valid correlations for them could not be computed. Only 20 of the worker characteristics survived this step. In addition, the variables (46) "Tools used," and (47) "Knowledge of graphic instructions required," remained. The twenty-third variable of the study was Skill.

Skill was expressed in three categories—skilled, semiskilled, and un-

Table 2

Matrix R_0. Correlation of 23 Characteristics for 275 Occupations *

Skill	1	2	3	4	5	6	7	9	11	12	14	16	21	22	27	32	33	41	42	43	46	47
Skill	−47	−02	−06	−18	03	28	23	24	25	42	52	48	28	51	44	37	46	05	10	−03	18	42
1		22	−05	00	00	20	00	18	18	−10	−21	03	−20	−42	−14	−02	08	−22	07	−14	−22	−26
2			82	50	62	−07	44	24	25	30	34	−06	22	17	−04	13	02	27	06	15	34	22
3				88	72	−40	23	02	12	−02	11	−03	11	−01	−16	10	06	34	−13	27	32	06
4					91	−29	−15	−14	−15	−08	−02	−21	−10	−19	−06	03	04	24	−18	24	21	−02
5						−21	−08	−06	−16	16	00	−22	−12	−05	02	−03	11	24	−32	08	13	01
6							35	62	44	10	45	53	20	16	−02	18	25	−46	−05	−42	23	34
7								81	55	10	37	26	48	08	−13	07	−07	09	−14	01	34	36
9									67	24	52	48	39	00	−14	08	03	−02	−15	−19	37	34
11										14	37	24	18	21	20	23	28	−17	−26	10	10	26
12											66	33	36	14	00	−05	08	10	22	−12	29	19
14												35	43	14	05	21	04	−10	28	−22	48	41
16													38	08	03	21	26	−20	43	−37	09	02
21														−03	25	11	−10	−21	28	08	34	18
22															46	29	70	11	32	00	00	42
27																54	46	12	09	08	08	20
32																	55	−15	11	−15	30	52
33																		08	10	04	−12	25
41																			−06	64	12	09
42																				−14	05	08
43																					11	−02
46																						39

* All entries have been multiplied by 100 in order to eliminate the decimal point.

skilled—and was determined from the occupational code of each of the 275 occupations in the study sample. The intercorrelations between skill and the other 22 variables were found from 2X3-fold tables with unequally spaced intervals. Normal distributions and rectangular regression were assumed, each interval was assigned the value of its mean expressed as a deviate on a unit normal curve, and Pearson product-moment r's were computed. A correction for "broad categories" was then applied (**4**, pp. 167–171; **7**, pp. 399–402).

The matrix of intercorrelations is shown in Table 2.

The Factor Analysis Procedure. Eight centroid factors were extracted from the matrix of intercorrelations, by Thurstone's Centroid method (**13**). The centroid matrix is shown in Table 3. Estimates of the communality were used in the diagonal cells of the correlation and the residual matrices (**13**, p. 89), the estimates being the highest coefficients in each column. In the successive extractions the characteristics were

Table 3

The Centroid Matrix F_c. Projections of Worker Characteristics Vectors on 8 Arbitrary Orthogonal Axes Determined by the Centroid Method *

	I	II	III	IV	V	VI	VII	VIII	h^2
Skill	63	33	31	−27	12	23	−04	−18	78
1	−21	07	−36	33	−37	−19	−11	−13	49
2	58	−45	−34	18	−22	−19	−19	26	88
3	45	−78	−23	08	−25	−13	−11	07	97
4	23	−81	−16	−09	−39	14	16	−12	95
5	29	−71	−17	−10	−37	38	09	−12	93
6	28	63	−37	12	−06	27	18	−08	74
7	53	13	−41	39	38	−16	07	−03	79
9	53	33	−59	32	30	07	07	−20	98
11	46	32	−26	51	08	08	−12	−15	69
12	46	11	−16	−42	18	15	−40	09	65
14	66	25	−29	−32	19	16	−12	26	83
16	38	51	−21	−23	−16	−14	−16	−24	63
21	47	18	−22	−30	20	−39	18	−10	63
22	49	21	60	14	−18	22	−15	22	82
27	33	17	50	−06	−13	−10	17	−21	49
32	45	23	28	05	−30	−13	36	11	58
33	44	24	45	27	−50	17	−16	−23	88
41	21	−54	36	15	30	−10	−24	−13	66
42	11	27	13	−33	−18	−39	−32	28	58
43	10	−50	31	20	37	−18	−17	−29	68
46	54	−16	−16	−11	20	−11	30	24	55
47	58	14	19	17	11	13	31	36	68

* All entries have been multiplied by 100 in order to eliminate the decimal point.

Table 4

The Transformation Matrix Λ *

	A	B	C	D	E	F	G	H
I	28	39	40	24	37	29	34	01
II	−69	32	27	−30	33	−05	−07	19
III	−34	64	−14	40	−53	−04	15	−07
IV	−16	22	−70	08	65	03	−25	−20
V	−50	−48	09	59	18	−33	23	−24
VI	19	17	−06	−17	02	−86	−08	−24
VII	−06	04	−49	−33	04	−03	83	29
VIII	−09	−11	−08	−45	−15	25	21	−85

* All entries have been multiplied by 100 in order to eliminate the decimal point.

Table 5

Rotated Factorial Matrix $V = F_c\Lambda$ *

	A	B	C	D	E	F	G	H
Skill	−11	49	52	28	05	−14	24	16
1	13	−06	−20	−28	30	22	−40	18
2	62	−06	10	00	27	52	−01	−27
3	83	−12	−02	14	02	40	03	−14
4	91	−06	−15	−03	−20	08	14	09
5	91	01	−07	−05	−14	−11	08	03
6	−17	19	15	−36	60	−17	06	19
7	−09	−13	04	20	78	18	16	−03
9	−05	−10	16	05	91	−04	07	15
11	−09	21	02	09	78	01	−15	04
12	13	−07	73	15	02	−03	−05	−15
14	08	−02	64	−05	27	05	23	−20
16	−05	20	57	−07	27	20	−08	39
21	−05	−11	44	12	21	37	39	30
22	−11	77	10	11	−04	04	07	−27
27	−13	57	08	20	−11	14	27	30
32	−04	56	−04	−17	07	34	43	13
33	07	88	03	07	12	07	−18	19
41	14	02	−06	70	−13	05	−02	−16
42	−14	12	47	−09	−25	48	−10	−08
43	05	−06	−13	75	−06	01	−03	00
46	17	−10	13	03	17	25	55	−13
47	−11	37	−05	−03	25	09	52	−29

* All entries have been multiplied by 100 in order to eliminate the decimal point.

reflected by a method which maximized the amount of the total variance which was accounted for by each new factor (**13**, pp. 99–100).

After eight extractions, the extraction process was discontinued because some communalities appeared to be spuriously great, and in fact

the ninth centroid factor would have increased two of the communalities to more than unity. Neither Coomb's criterion (**2**) nor McNemar's criterion (**6**) for the number of factors appeared applicable. This may have been because the scores in this study were based on judgment rather than tests.

The arbitrary axes of the centroid matrix were then rotated by Thurstone's method of extended vectors (**11**) until a solution was obtained which for the most part satisfies the requirements of simple structure. The transformation matrix A is shown in Table 4, and the rotated factorial matrix is shown in Table 5. An effort was also made to keep the correlations between the primary factors as close to zero as possible. The range of these correlations is from .16 to −.14

Interpretation of Factors

The significant factor loadings are here considered to be those of .40 and above. Thurstone notes that "the naming of a factor cannot be made with confidence unless the projections are as large as .50 or .60 so that the factor accounts for a fourth or a third of the variance of a test" (**12**, p. 79) or measure. Loadings below .20 are of no significance. Loadings between .30 and .40 may be important.

Factor A. The characteristics which enter significantly into Factor A, and their loadings, are: 4. Strength of back, .91; 5. Strength of legs, .91; 3. Strength of arms, .83; and 2. Strength of hands, .62.

Factor A has been designated as Strength. All of the loadings are phenomenally high. The intercorrelations also were very high, indicating the correspondence between the traits.

Factor B. The following characteristics have significant loadings on B: 33. Attention to many items, .88; 22. Memory for details (things), .77; 27. Intelligence, .57; 32. Understanding of mechanical devices, .56; Skill level, .49; and 47. Graphic instructions, .37.

The underlying factor in B appears to be Intelligence. The higher loadings of characteristics 33 and 22 may be due to a tendency on the part of the analysts to underestimate the amount of intelligence required for industrial jobs of a semi-clerical character.

Factor C. Factor C has the following loadings: 12. Estimate size of objects, .73; 14. Perceive form of objects, .64; 16. Keenness of vision, .57; Skill level, .52; .42. Estimate quality of objects, .47; and 21. "Muscular" discrimination, .44.

Factor C appears to be an Inspection factor, perhaps predominantly visual inspection. Characteristic 21 refers to kinesthetic sensitivity, and it and perhaps Skill level are the only characteristics here which are not visual.

Factor D. Factor D has significant loadings as follows: 43. Work under unpleasant physical conditions, .75; 41. Work under hazardous conditions, .70; and 6. Dexterity of fingers, −.36.

This factor, which may be nothing more than a doublet, has been designated Physically Unpleasant Working Conditions. The relatively large negative loading of Characteristic 6 may be a sampling error, or it may be attributed to the gross movements involved in work which is outstandingly physical.

Factor E. The following significant loadings appear in Factor E: 9. Eye-hand coordination, .91; 7. Dexterity of hands and arms, .78; 11. Coordination of independent movements of both hands, .78; 6. Dexterity of fingers, .60; and 1. Work rapidly for long periods, .30.

This factor appears to be primarily Manual Dexterity. Eye-hand coordination has the highest loading on this factor, but the distinction between this characteristic and Characteristic 7 is not entirely clear. The correlation between the two characteristics is .81. The example cited in the manual on Worker Characteristics for an A amount of Characteristic 7 is Drill-Press Operator (**3**, p. 16); and for Characteristic 9 the example cited is Engraver, Hand IV (**3**, p. 19). A case might be made for the interchangeability of the two examples. Whether the two characteristics are substantially the same is not, of course, established by this study. The fact of the relationship as here measured is merely noted.

Factor F. Factor F has the following significant loadings: 2. Strength of hands, .52; 42. Estimate quality of objects, .48; 3. Strength of arms, .40; 21. "Muscular" discrimination, .37; and 32. Understanding of mechanical devices, .34.

It is not believed that this factor is psychologically meaningful as it stands. Had enough care been taken it is possible that the factor would have converged with the A and C planes. Perhaps Characteristics 2 and 3 or Characteristics 21 and 42 might have been established as independent factors.

Factor G. Factor G has the following significant loadings: 46. Tools used, .55; 47. Knowledge of graphic instructions required, .52; 32. Understanding of mechanical devices, .43; 1. Work rapidly for long periods, −.40; and 21. "Muscular" discrimination, .39.

Factor G appears to be a Mechanical Information factor. The significance of the large negative loading on Characteristic 1 can only be surmised. Most psychological traits, such as intelligence, numerical ability, verbal ability, exist in positive or zero amounts, but not in negative amounts. However, negative traits are recognized. Thurstone notes, for instance, such opposite traits as "tactfulness" and "tactlessness" (**13**,

p. 165). In this instance, it is not known whether what is indicated is that workers with a fund of mechanical information do not work rapidly or that they do not work for long periods of time at a stretch.

Factor H. Factor H is a residual factor, with no significant loadings and apparently without psychological meaning: 16. Keenness of vision, .39; 21. "Muscular" discrimination, .30; and 27. Intelligence, .30.

Summary

The 20 Worker Characteristics, together with Skill and two other job characteristics, have been reduced to six meaningful factors: Strength, Intelligence, Inspection, Physically Unpleasant Working Conditions, Manual Dexterity, and Mechanical Information. This economy has been effected at the cost of a certain loss in specificity. Whether factor scores for the 275 occupations would be as valuable as a larger number of more specific scores depends on the use to which the information is to be put; just as the information contained in the Worker Characteristics Form is more and less valuable in various respects than the extended information in a voluminous job analysis. Certainly for the purpose of establishing a limited number (less than fifty) of occupational fields distinguished on the basis of worker characteristics for use in counseling, six factors are perhaps as many as can be considered. In this event it becomes important to find six independent and fundamental factors.

Such factors may be sufficient for the broad mass of industrial jobs. At the professional level they would not; there it would certainly be important to break up Intelligence at least into the verbal, numerical, and spatial factors commonly found in the literature.

A not inconsequential finding is that of the Strength factor. Aptitude tests for occupational selection do not ordinarily include a strength test, nor is it important that they should. But for many jobs at least a coarse evaluation of the strength of the applicant should be made in conjunction with and prior to test administration. There is little point in testing the manual dexterity of a physically weak applicant for a job which requires both strength and manual dexterity.

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Reported and Demonstrated Values of Vocational Counseling

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The question most frequently asked by individuals considering vocational counseling is, "How successful is such counseling?" Consultants also have a vested interest in the answers to the questions, "What are the values which the individual feels he has gained from the counseling process?"; "What are the demonstrable practical outcomes of such counseling?"

There is a dearth of scientific evidence bearing on these questions. Much of the content of popular articles on the subject tends to mislead rather than inform the public as to the aims of qualified counselors and as to the justifiable expectations of the individual counseled.

Careful investigation in these areas is important because of the increased public interest and professional activity in vocational counseling. It is also essential for the contributions which may be made to improvements in counseling procedures.

Recognition of the desirability for such research is reflected in investigations which have been initiated and reported by Veterans' Advisement Centers (**1**, **2**, **3**).

Two independent but related counseling projects afforded the writer the opportunity to investigate: (1) the evaluations of their counseling experience by a group of civilian industrial employees; and (2) the practical outcomes of counseling for a group of ex-Service men.

The first of these projects was initiated by the Woodward Governor Company during World War II in the interests of the post-war readjustments of temporary employees and in the interests of the most effective use of the employees' skills. Comprehensive vocational counseling by a unit [1] directed by the writer was made available to all employees at company expense. A total of 1184 (85 per cent) of plant personnel at all occupational and executive levels availed themselves of this opportunity.

The counseling was completed the week of V-J Day. Prior to this period, a follow-up questionnaire designed to evaluate the benefits of the counseling experience had been circulated to 1086 counselees, 671 men and 415 women. The number of returns was limited by the dropping

[1] The full-time counselors were: Olive Bray, Ralph Filburn, and William Van Newkirk. Miss Bray supervised the tabulation and analyses of the questionnaire returns

of 600 employees the Monday after V-J Day, and by the fact that a considerable number of employees who had previously left the plant could not be reached. In addition, 51 men who had been counseled just before their induction into the Services were not sent questionnaires.

A total of 685 returns was received out of 1086 questionnaires distributed, a return of 62.1 per cent for men, 64.6 per cent for women, 63.1 per cent for the total group.

Excerpts are quoted from the statement accompanying the questionnaire: "The only interest in the returns is in getting a frank unbiased expression of opinion from each member as to what the counseling has meant to him or her. The counselors are not asking for bouquets, although they don't object to them. They are looking for any clews they can get as to whether, and if so how, the service can be made more helpful." The following statement was included from the company president: ". . . At the present time, Rockford industrial, commercial and agricultural leaders are seriously considering a vocational counseling set-up for returning service men from this area. You will help these men make a more intelligent decision in regard to such a program, and you will make a contribution to those who are developing and improving counseling procedures if you will give them the benefit of your experience." . . . "You will notice that a number appears in the space after *Name*. This is your code number known only to your counselors. You need not sign your name unless you wish to." . . . "The management will not read individual questionnaires and is not interested in *who* says *what*, but in the trend of results."

It would appear that the accompanying statements encouraged critical rather than complimentary answers.

Counseling Procedures

A preliminary description of counseling procedures is pertinent to the presentation of results.

Vocational counseling as practised in this project involved the integration of comprehensive measures of aptitudes and interests with: (1) detailed information about the individual's personal, educational, and vocational background; (2) the evaluation of personality characteristics and emotional adjustment through both interviews and objective measures; (3) available resources for training or avocational expression. The resulting integration was then used in helping the counselee to assimilate the interpretations evolving from his study, to arrive at decisions and implement them through appropriate measures.

A first step in setting up the project was a survey of community resources. This was ably administered by Dr. Ruth Cavan, a University of Chicago sociologist resident in Rockford. Dr. Cavan or her assistants personally interviewed the representatives of all institutions and agencies which offered educational, avocational, and vocational programs. All pertinent information

with respect to their offerings was compiled in a cross-referenced file for the use of the counselors. Information about educational resources outside of the city supplemented this file.

A second preliminary project was the assembling of a loan library in the plant. This included a comprehensive range of sources of vocational information, selected books on personal adjustment, child guidance, and adolescent psychology.

The plant project was initiated through orientation talks attended by all plant personnel. In these the procedures, aims and possible outcomes of counseling were discussed. Subsequent to this a common battery of tests was administered to all plant personnel in groups of 50–100. This served the dual purpose of introducing the testing program and of developing general and differential plant norms for the tests used. The preliminary battery of tests included the Adult Placement Test (a mental alertness test with verbal and numerical sections), the Psychological Corporation General Clerical Test, and the Revised Minnesota Paper Form Board Test. The Allport-Vernon Study of Values was used as an initial approach to interest trends. This measure was used with the expectation that it would be less applicable to those with limited educational backgrounds. Contrary to expectations, uniformly active interest was demonstrated by all.

After the completion of this testing schedule, each employee made his own decision as to whether he wished to continue with the comprehensive counseling. Individual interview appointments were then scheduled.

Prior to the individual interview, the counselor assembled the above test results, and the information in the plant personnel files. The latter included: (1) a comprehensive application questionnaire covering personal and family data, education and recreational activities; (2) previous employment references; (3) a plant employment record including periodic supervisors' evaluations and ratings, salary increases, transfers and promotions; (4) results of medical and visual examinations, and (5) the results of objective tests (chiefly trade information and arithmetic) administered as part of the application procedures.

In the first individual interview, the counselor corroborated and supplemented the above types of information, explored the counselee's attitudes toward his current position and job transfers, his educational objectives, and his social and personal relationships.

Two most important aspects of this interview were the establishing of a favorable relationship with the counselee and the opportunity to develop insights into his personality organization. At the termination of this first interview, the counselor asked the counselee to fill out the Bernreuter Personality Inventory, indicating it would be helpful in supplementing the interview. This was returned directly to the counselor. This practise was found to be essential if this instrument was to contribute any value.

On the basis of the interview and the compiled information, a supplementary appropriate testing battery was scheduled and individually administered by a psychometrist supervised by one of the counselors. The additional tests were chosen from a wide range of tests including intelligence tests, mechanical, artistic, musical, scientific, language, and clerical aptitude tests, achievement tests, and additional interest inventories.

A subsequent interview was scheduled when the counselor felt he had a basis for arriving at interpretations and recommendations. The integrity of the counselors in respecting the confidences of the employees led to counseling on intimate personal problems in many instances. Employees freely asked for further appointments. The plant physician cooperated actively on medical problems.

The maximum weekly case-load for each counselor was eight individuals.

The same procedures were followed in working with the veterans with the

exception of greater dependence on the interviews for personal and background data.

Two of the counselors had no previous experience in vocational counseling, although both had experience in applied psychology. One held the M.A. degree in psychology, the other had completed his course requirements for the Ph.D. degree in psychology. The third counselor held a Master's degree in vocational education and had had extensive experience in vocational education, educational guidance, and in industry both as an employee and a consultant.

The first months of the project constituted an in-job-training program for the counselors under the writer's guidance through review of cases and staff conferences. Such guidance was continued in periodic visits throughout the period of both projects.

Name ..... Date .....

Address ..... Present Occupation .....

Draw a circle around the word which is your answer to each one of the questions on this page.

1. As a result of your counseling did you get a better idea			
a. Of your strongest abilities?	Yes	No	Doubtful
b. Of your less strong abilities?	Yes	No	Doubtful
c. Of your personality traits in relation to fields of work?	Yes	No	Doubtful
d. Of ways of promoting your personal development?	Yes	No	Doubtful
e. Of other fields of work or training you might transfer to?	Yes	No	Doubtful
2. Will your counseling report influence your decisions as to future jobs or training?	Yes	No	Doubtful
3. Has your counseling report already influenced your decision as to a job or a field of training?	Yes	No	Doubtful
If so, was the decision in accord with the results of your counseling?	Yes	No	Doubtful
4. Did your test results show you had under-estimated your aptitudes			
a. For particular jobs?	Yes	No	Doubtful
b. In general?	Yes	No	Doubtful
5. Did you have ambitions which your test results did not support			
a. For particular jobs?	Yes	No	Doubtful
b. In general?	Yes	No	Doubtful
6. Did your counseling			
a. Increase your general self-confidence?	Yes	No	Doubtful
b. Decrease your general self-confidence?	Yes	No	Doubtful
7. Did your counseling on the whole give you a better understanding of yourself?	Yes	No	Doubtful
8. Do you feel that your counseling was a worthwhile experience?	Yes	No	Doubtful
9. Do you recommend that Woodward Governor continue such counseling?	Yes	No	Doubtful
10. Would you recommend it to others at their own expense?	Yes	No	Doubtful

Further Comment: (In the space below answer the question and make any further comments you would like to make. You may use the reverse side of the paper if you wish.)

At what age do you think such counseling should be provided? .....years.

FIG. 1. Questionnaire used in counseling follow-up study.

General Results

The complete questionnaire is reproduced in Figure 1.

The analysis of the replies to the different items for men and women separately and combined, and for the plant employees and those who had left the plant are presented in Table 1.

Table 1

Questionnaire Returns from Individuals Counseled

No. Cases	Men in Plant 366	Left Plant 51	Women in Plant 171	Left Plant 97	Total 685			
	% Yes	% Yes	% Yes	% Yes	% Yes	% No	% Doubtful	% No Reply
Question								
1(a)	63	76	75	91	71	17	9	3
(b)	57	69	68	78	64	18	12	6
(c)	60	73	65	76	65	16	14	5
(d)	55	65	60	66	59	21	13	7
(e)	41	63	61	77	53	30	11	6
2	46	55	49	66	50	29	19	2
3(a)	29	47	18	43	29	61	6	3
(b)	24	43	17	36	26	18	5	51
4(a)	31	51	37	58	38	46	9	7
(b)	26	27	42	36	32	49	12	8
5(a)	33	27	29	40	33	54	6	7
(b)	18	18	24	26	20	60	7	13
6(a)	55	80	57	57	58	28	11	3
(b)	7	6	6	3	6	63	8	22
7	66	80	70	88	71	17	11	1
8	76	90	84	96	82	8	9	2
9	64	82	70	89	70	14	12	3
10	63	71	64	80	66	16	15	3

The positive responses for the total group of 685 are presented at the right side of the Table. The results indicate that: 71 per cent got a better idea of their strongest abilities; 38 per cent found they had underestimated their aptitudes for particular jobs, 32 per cent in general;[2] 71 per cent got a better understanding of themselves; 65 per cent and 59 per cent respectively got a better understanding of their personalities in relation to fields of work or of ways of promoting their personality development. Although 33 per cent reported ambitions not supported by test results for particular jobs, and 20 per cent reported general am-

[2] The amount of over-lap in these per cents is not available.

bitions not supported by test results, 58 per cent reported increased self-confidence; only 6 per cent, decreased self-confidence.[3]

With respect to the vocational questions, 53 per cent got a better idea of vocational transfer possibilities; 50 per cent expect future vocational or training decisions to be influenced by their counseling; 29 per cent had already made such decisions, 26 per cent in accord with the results of their counseling. With respect to the last two figures, it should be noted that 21.6 per cent of the total group had left the company and had had the occasion to make use of the counseling. The 51 per cent who did not reply to question 3(b) includes those who answered 3(a) in the negative. Some individuals answered "No" to both 3(a) and 3(b). This accounts for the apparent discrepancy between the "Yes" answers to 3(a) and the "Yes" and "No" answers to 3(b).

The lower per cents of positive replies to Questions 9 and 10 (70 and 66 per cent respectively) may suggest skepticism as to the sincerity of the replies to Question 8 (82 per cent). The ensuing discussion has a bearing on this.

The project was initiated by orientation discussions attended by all plant personnel. At this time, emphasis was placed upon the fact that the counseling was a cooperative affair and that individuals would profit most who had a genuine desire for better self-understanding. The suggestion was made that individuals should elect the counseling because of such a desire and not because of curiosity nor because the counseling was to be at the company's expense. A considerable number who did not request counseling at the beginning of the project later asked for it, after reports began circulating through the plant as to the results. The final number counseled included a certain proportion of employees who had no serious need for counseling nor intention to put the results to practical use. When this is taken into consideration, the indication is that the per cents for the positive replies are lower than they would be for individuals requesting counseling because of a felt need. The per cents answering Questions 9 and 10 affirmatively may represent the proportion of the total group who had the more serious interest in self-understanding.

Differential Results

Examination of Table 1 reveals generally more favorable replies by those employees who had left the plant than by those still employed; also more favorable replies by the women than by the men.

Ninety per cent of the men and 96 per cent of the women who had left the plant answered Question 8 in the affirmative; 71 per cent and 80 per

[3] The 22 per cent not replying to 6(b) include the 19 per cent who did answer 6(a).

cent respectively answered Question 10 in the affirmative. The majority of the employed women were war-time employees. The more favorable replies by those who had had the occasion to apply their counseling or who anticipated a change in employment are considered significant.

The responses reflecting positive contributions were analyzed according to age, years of education, and percentile on the Adult Placement Test (a mental alertness test with verbal and numerical sections) for both men and women.

The results for the men are reported in Table 2.

Table 2

Affirmative Responses of 366 Men to Counseling Questionnaire Classified by Age, Education and Tested Ability

	Age			Years—Education				Ability—Percentile		
	(18–25)	(26–40)	(41+)	(1–8)	(9–11)	(12)	(13+)	(1–30)	(31–70)	(70+)
No. Cases	28	254	84	57	70	166	73	91	134	141
	%	%	%	%	%	%	%	%	%	%
Question										
1(a)	68	67	50	53	73	64	58	60	61	66
1(c)	54	65	48	53	69	59	60	52	59	67
1(d)	46	59	45	46	59	58	53	53	53	59
1(e)	46	43	35	37	47	40	42	46	40	40
2	50	50	33	33	56	45	49	40	46	50
6(a)	57	55	56	54	64	54	51	47	59	57
7	64	67	61	63	69	65	66	64	64	68
8	79	75	76	67	76	77	79	69	77	79
10	54	64	63	65	67	57	71	66	60	63

According to expectation, the oldest men derive less personal benefit than the younger men. In spite of this, a third of the group indicate their future decisions will be influenced by their counseling. They report increased self-confidence in the same degree as the younger men. Also, they support self-financed counseling as strongly as the younger group.

In the analysis for years of education, the group with a grammar school education or less report less favorably than the other groups. However, 33 per cent report that future decisions will be influenced, 54 per cent report increased self-confidence, 67 per cent feel it was a worthwhile experience and 65 per cent recommend self-financed counseling. The group with (9–11) years of education report the most positive benefits. Favorable test comparisons for many in this group with the high school graduates contributed to the more positive replies. The results for the group who are high school graduates and the group with

some college are in general comparable. The latter group support self-financing more positively than any of the other groups.

In the case of the ability groupings, the highest ability group report most favorably. However, the uniformity in the ability groups is more striking than are the differences.

The counselors had anticipated less favorable replies for the men with fewer years of education and lower test results. In many cases, the limited educational background and low test results on all tests used necessitated basing recommendations chiefly on work experience and interests. Some counselees resented this, as indicated by the adverse comment by a "minishinest," aged 47, with less than an 8th grade education and a test percentile below 30: "The test only gave me the same thing as the concolr talked of so the time it took to answer was wasted. I think as they did not tell me anything I did not know. I expected to learn a lot but was dissiponted."

In contrast, another counselee aged 42 years in the same educational and test groups replied affirmatively to 1(a) (b) (c) (d), 5(a), 6(a), 7, 8, 9, and 10. He added the comment: "Let me add my thanks and appreciation to the parties who conducted the tests and interviews. They were handled in a very friendly manner that made one feel they had your personal interest at heart." The tabulated results reflect more support for the attitude reflected in the latter statement.

Table 3

Group Comparisons with Total Plant Men

	Agree Total Plant Men	Disagree Total Plant Men Lower	Higher
Group I			
No. = 23	1(e)	1(a)	9
Age 41 or older	6(a)*	1(c)	
Median age 50	8	1(d)	
Education	10	2	
8th or less		3	
Percentile			
30 or less			
Group II			
No. = 32	1(a)	3(a)	1(e)
Age 26–40	1(d)		2
Median age 30	1(e)		10
Education	6(a)		
Some college	7		
Percentile	8		
70 or more	9		

* Only one of this group answered 6(b) in the affirmative.

A comparison is presented in Table 3 of the replies for men over 41 years in age with an 8th grade education or less, who fell below the 30 percentile on the Adult Placement Test, with the men aged 26 to 40 years with some college education, whose test percentiles were 70 or higher. Items on which each group agree or disagree with the total plant men are shown.

The older, less able group report less favorably than the total plant men on questions related to self-appraisal and vocational decisions; equally favorably on increased self-confidence, counseling as a worthwhile experience, and self-financing; and more favorably on counseling as a plant practice.

The younger, more able, better educated group report more favorably than the total plant men on possible job transfers, influence of counseling on future vocational decisions, and self-financing of counseling.

Table 4

Affirmative Responses of 171 Women to Counseling Questionnaire Classified by Age, Education and Tested Ability

	Age			Years—Education				Ability—Percentile		
	(18–25)	(26–40)	(41+)	(1–8)	(9–11)	(12)	(13+)	(1–30)	(31–70)	(70+)
No. Cases	81	55	35	13	31	89	38	33	73	65
Question	%	%	%	%	%	%	%	%	%	%
1(a)	80	65	80	54	71	78	81	67	77	78
1(c)	64	71	57	62	48	65	78	58	68	65
1(d)	64	62	46	46	55	62	63	52	66	57
1(e)	70	56	49	46	52	65	66	64	58	65
2	54	42	46	38	42	48	58	45	45	54
6(a)	60	49	60	54	58	53	66	55	52	63
7	74	58	77	69	61	71	74	76	67	69
8	86	84	80	69	84	82	95	70	85	91
10	67	65	57	46	55	66	74	48	66	71

In Table 4, the affirmative responses for the women are presented. Positive values are reported for all three age and educational levels, with the older, less well educated women reporting less favorably on ways of promoting personality development and job transfers.

Positive values are reported by all ability levels with the least favorable replies for those in the lowest ability level for questions bearing on personality in relation to fields of work, promotion of personality development and self-financing of counseling. Both the middle and low ability groups report less favorably on effect of counseling on future vocational

decisions. In general, the most favorable responses are for the highest ability group.

The majority of the older women were housewives working in the cafeteria or at unskilled jobs who were not contemplating post-war employment.

As previously indicated, this survey was conducted for the enlightenment of the counseling staff with respect to positive values reported and with respect to possible improvements in the procedures.

A higher proportion of returns is considered desirable for representative conclusions. Earlier in the project, however, the president of the plant personally conducted his own survey of employees who had been counseled. At that time, he received 80 per cent of favorable replies. The counseling unit felt that the group which had been counseled to that point was rather heavily weighted with older or less able men. This latter fact and the agreement of the earlier survey with the questionnaire returns provide some basis for regarding the latter as representative.

Attitudes Reflected in Counselees' Comments

Popular, much publicized articles have over-emphasized "the hidden talents" and "the many aptitudes" revealed by aptitude testing. Consequently, many individuals whose results do not reveal startling "new directions" or a "highway to success" experience a natural disappointment.

Qualified vocational counselors are modest in their claims as to the benefits of counseling. They are aware of the limitations in their techniques, of the many economic and social factors preventing full use of recommendations, and of the emotional resistances in counselees against accepting and acting upon interpretations which conflict with their own self-evaluations or their needs for emotional security and prestige.

A considerable proportion of respondents added comments to supplement their replies. Samples which reflect various attitudes of both a critical and a favorable nature merit report and discussion.[4]

Skepticism is expressed by a young college man in the high ability group as to whether the counselee should be given his results: "It is O.K. for the employer, but how much the individual should or need be told concerning his merits is debatable. Many middle group individuals are better performers than the so-called top-flight brains, because of the differences in character which tip the scales back to offset the original advantage. Why discourage the plugger by telling him he can't possibly reach his goal? Many will if they don't know that they haven't got the capacity." The evaluation of those compensatory assets which offset

[4] Other comments were included in the Psychological Service Center Bulletin for April, 1946.

less favorable test results constitutes the chief difference between comprehensive vocational counseling and aptitude testing. The respondent is not speaking from first-hand experience when he implies that the counselor tells the individual "he can't possibly reach his goal." The emphasis in each case is on the most positive potential possibilities of the individual. In arriving at these, some goals are indicated as less promising in returns for effort expended.

Another common misunderstanding is reflected in the comment of a fifty year old man who was a war-time employee. He had formerly been a photo-engraver. His results provided most positive support for returning to his former occupation. He stated, "I don't want to because I knew for years that I wasn't a whiz at that job and never would be. . . . I'd say that for me it (the counseling) was a bit wasteful of time although I found it interesting." A point requiring constant re-interpretation is the fact that recommendations for certain kinds of work do not carry an inherent guarantee of successful competition with others so engaged. On the contrary they indicate that chances for productivity are relatively better in the suggested fields than in other fields considered. From this man's comment, it is apparent that this was not sufficiently clarified in his interviews with the counselor.

Another comments, "I enjoyed taking the tests and talks with the counselor. . . . What I objected to most was methods of comparison. Instead of using John Doe, same age, same type community and same general type, we were given dozens of comparative types." This point is well taken. However, comparisons must necessarily be made in terms of standardization groups. This criticism overlooks the fact that plant norms were established for three of the basic tests given to the entire plant personnel. Norms were established for 16 occupational groups, 10 educational levels, and for the total plant group for the Adult Placement Test and the Psychological Corporation General Clerical Test. Norms for four occupational and two age groups for men, and for two occupational groups and two age groups for the women were established for the Revised Minnesota Paper Form Board Test. Comparisons were reported with the appropriate plant groups as well as with the standardization groups. The "dozens of comparative types" mentioned suggests the possibility that this counselee was given more comparisons than he needed or could assimilate.

Another man reports, "I sincerely believe that I wasted my time and the company's taking the tests. I was not in a proper frame of mind when I took them. . . . I would sincerely like to go through it again with ——— instead of ———." There was evidence that the personal factor of the counselor did influence the attitudes toward the counseling

results. An analysis of the questionnaires according to who had done the counseling reflected more favorable replies for certain of the counselors.

In many instances, transfers were made within the plant on the basis of the counseling results. Apropos of such changes is the following comment: "Since the counseling I have been shifted by the management into a job that is much more in line with my aspirations. I am very satisfied with the change."

Excerpts from other favorable comments include: "I think it was a great opportunity and intend to follow it as closely as possible." "I think it is a good thing because it is so easy to be mistaken by wishful thinking." ". . . It helped me a great deal in planning my future." "I used my counselor's summary to good advantage in obtaining the above position." ". . . Gave me a better idea of opportunities for employment of one of my age." ". . . Gave me confidence in myself to do the kind of work I've always wanted to do." ". . . Gave me good insight into the future in the respect of family affairs." ". . . Received several helpful suggestions that have proved beneficial in my everyday life."

Placement Follow-up of Veterans

The second project referred to above afforded the opportunity to check placement outcomes against counseling recommendations. The more subjective evaluations of the benefits of counseling could be compared with practical results.

A Veterans' Information and Placement Service was set up and financed by Rockford business men and industrialists just subsequent to the completion of the plant project. The vocational counseling for this project was handled by the same counseling unit which functioned in the Woodward-Governor Company.[5] A full time placement officer worked independently but cooperatively with the counseling unit in finding employment for the veterans.

The veterans comprise the age-range least represented in the plant studies. As a group, they represent a higher educational level than the plant men. Fifteen per cent had less than a high school education, compared to 34.7 per cent for the plant; 61 per cent were high school graduates, compared to 45.3 per cent for the plant; and 24 per cent had had some college training or were college graduates, compared to 20 per cent for the plant. Twenty-two per cent were commissioned officers, 78 per cent were non-commissioned officers, technicians, or privates in the Services.

[5] Miss Olive Bray left the staff at this time to set up a counseling unit at Rockford College for Women.

When he applied for the counseling service, the veteran agreed that the placement officer was to be given a copy of the vocational recommendations. In order to make the latter as meaningful as possible, a code was developed which indicated whether the veteran had the supporting qualifications for a suggested occupation in high degree, in moderate degree, or in questionable degree; also whether he needed further education, on-the-job training, or work experience.

Since a number of alternatives was listed for each veteran, the code enabled the placement officer to guide the men into those activities for which they were best qualified. Periodic check-ups were made with both the employee and the employer after placement. The records of placement and follow-up were kept by the placement officer. The analysis of the results was made by him and made available to the writer.

The results reported were compiled at the time that 516 veterans had completed their counseling. Of this number, 444 were available for follow-up in Rockford. Of these, 82.4 per cent were satisfactorily placed in recommended jobs according to their own and their employers' statements; 10.9 per cent had been placed in other jobs. At the time of the last follow-up, 7 per cent were not yet employed. The last group included a number of men in upper economic brackets who had not sought employment.

The employment stability record was one of the most outstanding results of the veterans' placement service. Of those employed, only eleven men, less than 3 per cent, had changed jobs in a period of 19 months.

Labor turn-over was high in the early post-war period. For the mid-months of the veterans' counseling project (January and February, 1946), the monthly turn-over for eleven major U. S. industries (**5**) ranged from a low of 5.3 per cent to a high of 13.1 per cent; for manufacturing it was 6.8 per cent. Since Rockford is a manufacturing center, the comparison between the latter figure and the record of the veterans' placement service provides some basis for judging the value of counseling prior to placement.

Summary

Analyses of replies to a questionnaire designed to gauge counselees' estimates of the benefits of counseling have been presented. The results were analyzed separately for employees remaining in their jobs and those who had left for other work or training. Results were also analyzed according to age, education, ability level, and sex of counselees.

The trend of the questionnaire returns provides strong confirmation that the counseling had significant positive values for the participants. The results also confirm the philosophy underlying the framing of the

questionnaire. That is, that the values vary from individual to individual. The fact that the highest per cent (82) of positive replies is to Question 8, "Do you feel that your counseling was a worthwhile experience?", may be regarded as evidence that the values are distributed among the areas covered by the other questions. More favorable reports were made by those who had had the occasion to use the results of their counseling, and by those who anticipated post-war job transfers.

Volunteered comments have been reported which throw light upon some of the common misconceptions of counseling, on necessary cautions to be observed by counselors, and on the varied positive contributions to the individuals counseled.

A supplementary report is included of placement follow-ups for veterans who had been placed in accordance with the results of their counseling. Of 444 veterans available for follow-up, 82.4 per cent were satisfactorily placed according to their own and their employers' statements. During a period of 19 months, less than 3 per cent had changed jobs.

This report has not included the replies to the final question on the questionnaire with respect to recommended age for counseling. These results have been analyzed in a separate report (**4**).

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Vocational Interests of Accountants

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In scoring Strong's Vocational Interest Blank, three scales have been employed to measure the interests of men employed in office-accounting work (**5**). These are:

1. Office worker, representative of office activities in business concerns including bookkeepers, purchasing agents, credit managers, and office managers.
2. Accountant, based upon the records of 160 general accountants, 54 cost accountants, 65 auditors, and 66 comptrollers and treasurers.
3. Certified Public Accountant, so certified in the states of New York and California.

Accountants and CPA's were further differentiated in developing the scales so that the former represented men regularly employed by business firms whereas the latter were employed by public accounting concerns. Among the former were some men holding the CPA certificate. But they were classified as accountants, not CPA's on the basis of the employer for whom they worked rather than on the basis of whether or not they had the CPA certificate.

A fourth scale is related to the above, i.e., Purchasing Agent, composed entirely of purchasing agents, whereas the Office Worker Scale is primarily representative of bookkeepers and related office activities with a smaller representation of men holding more advanced positions in office work.

Since these scales were developed there have been many queries regarding the relationship between the Accountant and CPA Scales, because each group scored about 40 on the other scale but the correlation between them was only .28.

The primary question concerning us here is: do the Accountant and CPA Scales measure what they purport to measure?

In 1943 a survey was made of members of the American Institute of Accountants by Dr. Ben Wood and Dr. A. E. Traxler, under the direction of the Committee on Selection of that Institute. The survey included tests of: (a) ability or achievement, with which we are not here concerned; and (b) the Vocational Interest Test. Data on the latter were obtained from 1856 accountants (**1**). Additional records of 1117

accountants in Canada were secured under the auspices of the Dominion Association of Certified Accountants (**2**).

Occupational interest scores were determined for 1000 of the American accountants, 200 from each of five sub-groups, namely, partners, managers, seniors, semi-seniors, and juniors. The median score on each of twenty-three scales agreed very closely with the medians based on the 1117 Canadians.

On the basis of these data the present Accountant Scale is judged adequate for juniors since the distribution of letter ratings of 314 juniors agreed very closely with the distribution of ratings of the criterion group. See Table 1.

Table 1

Percentage Distribution of Letter Ratings on Accountant Scale of 314 Junior Accountants and Members of Criterion Group upon which the Scale is Based (**2**)

Letter Rating	Juniors	Criterion Group
	%	%
A	65.0	69.2
B+	16.2	15.0
B	12.1	9.2
B−	3.2	4.4
C+	2.9	1.6
C	0.6	0.6

At first thought it is surprising that the Accountant Scale should represent the interests of junior accountants. The Accountant Scale, as pointed out above, represents not merely men of junior level but also to some extent men of higher levels up to the top ranks of comptroller and treasurer. The explanation may lie in the likelihood that the group of juniors contains within it men who are destined, later on, to reach intermediate and top levels of accounting work in a business concern. If this is the situation it is support for the writer's procedure of developing scales for an occupation rather than a position or level within an occupation.

The present CPA Scale, on the other hand, does not properly represent the interests of the great majority of public accountants. See Table 2. None of the sub-groups, except partners, scores high enough for the Scale to be considered as representative of their interests. The distribution of scores of partners is such that the Scale can be used to represent their interests fairly well, although it is to be expected that partners will secure somewhat fewer A ratings and more B and B− ratings than should be expected from a scale that adequately represents them.

This raises the question, when may two groups be considered to be one group and when two separate groups? What objective criteria may be set up to answer this question? Use of critical ratios, or their equivalent in terms of level of significance, is not applicable. Two means may be significantly different and at the same time common sense indicates that the two groups differ too little to be divided into two separate groups. Percentage of overlapping appeals to the writer as probably the best criterion to use in this connection.[1] There is, however, no

Table 2

Percentage Distribution of Letter Ratings on Original CPA Scale of Five Levels of Accountants and of Members of the Criterion Group (2)

Letter Rating	Criterion Group	283 Partners	226 Mgrs.	582 Snrs.	361 Semi-Sen.	311 Juniors	1766 Total
	%	%	%	%	%	%	%
A	72.6	60.8	44.3	36.8	38.8	31.2	41.0
B+	13.6	14.8	19.0	20.3	16.6	18.5	18.2
B	6.2	12.0	20.4	19.1	18.3	16.9	17.5
B−	3.7	8.5	9.7	12.7	12.7	17.2	12.5
C+	2.5	2.8	4.4	6.7	7.2	11.1	6.7
C	1.4	1.1	2.2	4.4	6.4	5.1	4.1

accepted agreement as to what percentage of total overlapping should be used as the cutting point. Using the data in Table 2, we have 87.9 per cent overlapping between scores of the criterion group and partners but only 71.7 per cent between the former and managers. Our present judgment is that 88 per cent is too high an overlapping to consider the two groups separate groups and that 72 per cent, on the other hand, is too low to include the two in one group. In making this statement we have in mind the overlapping of a considerable number of pairs of groups. One difficulty in arriving at the proper cutting point lies in the fact that popular opinion respecting whether two groups are similar or not and percentage of overlapping do not correlate perfectly.

Senior CPA Scale

A new scale has been developed based on the interests of 611 Senior CPA's. This Scale will be designated as "Senior CPA" in contradistinction to the old CPA Scale, to be referred to from now on as the Partner CPA Scale. The new Scale has a reliability of .89, which is much higher than the old Scale.

[1] Percentage of overlapping is the percentage of scores of one group which may be matched with scores in the other group, (8).

Table 3

Mean Scores of Office Men and Three Groups of Accountants on Their Four Scales and Also on the OL Scale

Scales	Occupational Groups							
	Office Man		Accountant		Senior CPA		CPA Partner	
	M	σ	M	σ	M	σ	M	σ
Office Man	49.4	10.4	46.9	9.8	43.9	9.5	35.8	11.0
Accountant	43.6	11.4	50.3	9.6	47.7	8.4	41.1	11.7
Senior CPA	—	—	—	—	49.7	10.1	—	—
CPA Partner	31.6	9.8	39.3	11.0	42.4	9.4	50.1	10.4
OL	57.1	7.6	59.6	8.0	57.4	6.3	62.7	7.0

The relationship of the four scales of Office Worker, Accountant, Senior CPA and Partner CPA are shown in Table 3. Scores on the Office Scale go down from office worker to CPA Partners and, in reverse, scores go up on the Partner CPA Scale from Office Worker to CPA Partner. Senior CPA's who hold an intermediate position between juniors and partners have interests more akin to juniors than to partners as far as scores on the four scales go. This is also true with respect to scores on the OL Scale.

Table 4

Correlation between Interests of Senior CPA's and Other Occupations and Mean Scores of Senior CPA's on the Various Scales

r	Scale	Mean	r	Scale	Mean
.72	Mathematics-Science Teacher	33.6	.10	Banker	35.7
.72	Accountant	47.7	.07	Partner CPA	42.4
.64	Policeman	30.2	.06	Mathematician	21.7
.58	Office Worker	43.9	.03	City Sch. Supt.	23.9
.53	Production Manager	38.6	.02	Psychologist	15.9
.53	Printer	30.8	−.01	Musician	23.6
.52	Aviator	29.3	−.07	Minister	16.4
.52	Forest Service	24.6	−.08	Dentist	20.8
.50	Carpenter	20.6	−.21	Architect	20.7
.47	Public Administrator	39.9	−.29	Physician	23.8
.41	Personnel Manager	35.3	−.36	President	32.6
.39	Y. Physical Director	25.8	−.40	Realtor	34.1
.38	Farmer	30.6	−.40	Life Insurance	28.7
.33	Purchasing Agent	38.7	−.55	Artist	16.7
.31	Engineer	31.8	−.55	Lawyer	30.2
.26	Chemist	27.8	−.61	Advertiser	28.4
.20	Social Science Teacher	29.1	−.70	Author	26.1
.19	Y.M.C.A. Secretary	24.3	−.64	OL	57.4
.16	Sales Manager	32.4	.59	MF	48.2

The correlation of interests of Senior CPA's and men in 36 occupations are given in Table 4. The correlations with accountant and office worker are .72 and .58, but only .07 with partner CPA's. The latter low correlation is similar to .28 between accountant and partner CPA and .06 between office worker and partner CPA. The interests of CPA partners are clearly quite distinct from the interests of office workers, junior and senior accountants. This relationship is shown clearly in terms of OL scores. Partner CPA correlates .43 with OL whereas the other three scales correlate negatively with OL, i.e., −.26 with accountant, −.33 with office man and −.64 with senior CPA's. The difference here is very large between partner CPA and the other three scales.

In line with the low negative correlation with OL the interests of senior CPA's are correlated positively with occupations in Group IV, i.e., mathematics-science teacher, policeman, printer, aviator, forest service, carpenter and somewhat lower with farmer. Actually the Senior CPA Scale correlates on the average of .54 with the seven occupations in Group IV, whereas the Accountant Scale correlates only .15, the Office Scale .09, and the Partner CPA Scale correlates −.44. This is a most unexpected relationship. The interests of Group IV typify mechanical interests. Why should senior accountants exhibit such interests and also why should they exhibit more mechanical interest than partners, on the one hand, and juniors on the other hand?

To what occupational group should the new scale be assigned? Up to the present time Group VIII has contained purchasing agent, office worker, accountant and banker. But senior CPA cannot be grouped with these four since it correlates only .33 with purchasing agent and .10 with banker. On the basis of correlations of .60 and over senior CPA's should be grouped with mathematics-science teacher (.72), accountant (.72), policeman (.64), and, if we stretch a point, office worker (.58). If high mean scores are considered, senior CPA should be grouped with accountant (score of 47.7 on that scale), office worker (43.9), partner CPA (42.4); and in the neighborhood of public administrator (39.9), purchasing agent (38.7), and production manager (38.6).

Ordinarily, as the correlation between two interests goes down, the mean scores of each on the other's scale also go down. But here we have an exception to this relationship. For example, the interests of senior CPA's correlate .72 with mathematics-science teacher but they average only 33.7 on that scale. Similarly the correlation with policeman is .64 but the mean score on that scale is 30.2. In grouping occupations it seems desirable to take both correlation and mean score into account. The writer, however, has found no statistical way of combining the two measures. About all that can be done is to group occupations on the

basis of both measures on a common sense basis. Upon this basis we would disregard the high correlations between senior CPA and both mathematics-science teacher and policeman because of the low mean scores. Another reason for doing this is that occupations having no obvious connection in everyday life should not be included in the same group. To ignore this criterion might result in occupational groups which are useless as far as guidance and selection are concerned (**5**).

For the time being, we suggest a division of the present Group VIII into Group VIIIa composed of purchasing agent and banker and Group VIIIb composed of accountant, senior CPA and office worker. The two sub-groups differ too much to be considered as one occupational group.

In terms of the Interest Global Chart, senior CPA should be located below accountant in the direction of Group IV but its exact location can only be determined by factor analysis.

CPA Partner Scale

We hope to revise the original CPA Scale before long, from now on to be called the CPA Partner Scale. Until that is done we believe the present scale is of distinct value. It reflects interests of a managerial type not particularly reflected in either the new Senior CPA Scale or the old Accountant and Office Worker Scales. The data in Table 2 make clear that scores on this scale decrease as one goes from partner to manager to rank-and-file accountant.

The fact that the CPA Partner Scale correlates highest of all with the Lawyer Scale (i.e., .57) but only .28 with accountant, .07 with Senior CPA and .06 with office worker, indicates to the writer that the CPA Partner and Lawyer Scales express the interests involved in dealing with a client regarding accounting or legal matters, an activity not common to the non-managerial employee.

Again and again in studying the interests of members of an organization the fact is brought out that there are real differences in the interests of the rank-and-file of employees and the interests of the administrators or executives in the top levels of management (**4**, **6**, **7**). We believe such differences are reflected in the noticeable differences in scores between the Senior CPA and the CPA Partner scales.

Existing data indicate that only a small minority of the rank-and-file of employees possess the interests that characterize the top managerial group. The evidence so far supports the assumption that it is from this minority that the future managers will come. If this is true it is most important to identify the minority early in their employment and to afford them special opportunities to prepare for advancement. The writer does not feel that the above point of view is more than a good

working hypothesis today. It is possible that interests may change with promotion and increasing responsibilities. If this proves to be correct it means that an organization should give attention to the early training of its superior subordinates not only in procedures but also as regards interests. How the latter is to be done, if it can be done, is certainly not definitely formulated today.

Occupational Interest Scores of Accountants

Table 5 gives the occupational interest scores of six groups of accountants on the 13 scales on which 1000 public accountants score the highest. The 1000 accountants are composed of 200 each of partners, managers, seniors, semi-seniors and juniors. The scores of students in accounting

Table 5

Occupational Interest Scores of Six Groups of Accountants

Note: Data in first three columns are medians, after Wood and Traxler; remaining data are mean scores.

	1000 Public Account-ants	100 Acct. Seniors	100 1st Year Students	100 Senior CPA's	100 Account-ants	100 Office Men
Accountant	47.5	44.6	40.3	47.7	50.3	43.6
CPA Manager	42.5	36.8	32.8	42.4	39.3	31.6
Office Man	—	—	—	43.9	46.9	49.4
Production Manager	39.8	38.2	37.0	38.6	39.2	36.2
Purchasing Agent	39.6	38.5	39.6	38.7	41.9	42.2
Banker	36.7	37.5	35.3	35.7	39.0	37.8
Personnel Manager	35.2	40.7	40.2	35.3	34.6	29.6
President	35.2	34.5	35.8	32.6	34.4	34.4
Realtor	34.7	—	—	34.1	35.6	39.2
Sales Manager	33.9	38.4	40.3	32.4	35.5	36.9
Math.-Science Teacher	33.4	33.2	31.2	33.7	30.1	27.9
Engineer	32.3	23.2	22.6	31.8	28.1	25.7
Lawyer	31.4	30.8	30.8	30.1	29.3	28.2
OL	—	—	—	63.1	59.6	57.1

approximate the scores of the thousand accountants but differ by having higher scores in personnel and sales management and lower scores on accountant, engineer, and especially CPA Partner. The differences are presumably due to the expectation that some of the students will not go into accounting work and that these students have less interest in accounting than the remainder.

The office men and accountants, representative of juniors, differ from

seniors in higher scores on office interest and lower scores on CPA Partner interest and OL.

Unfortunately Wood and Traxler did not score their blanks on the Office Men and OL Scales. These scales throw as much light on the relationship between the levels of accountants as any. The writer has found that the office man scale is the best single scale for indicating business interest. All business men from president to office man spend a good share of their time looking at and shuffling papers. When a counselee scores low on this scale one should have him consider other occupations than typical business activities.

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Vocational Interests of Psychologists *

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This study was undertaken with the general objective of making the Strong Vocational Interest Blank a more useful tool for the guidance of both beginning and advanced psychology students. More specifically, the study proposed: 1. to determine the adequacy of the 1938 S. V. I. B. (Strong Vocational Interest Blank) psychologist key and to construct a new key if it seemed necessary; 2. to develop interest profiles for various sub-groups of psychologists based on the scores of these sub-groups on all the 1938 S. V. I. B. keys; and 3. to construct new keys for several sub-groups of psychologists so that better differentiation between sub-groups could be secured.

The Pilot Study

As a pilot study, 95 prominent psychologists who could be classified quite clearly as experimental, social, guidance, statistical, or industrial psychologists were asked to fill out the S. V. I. B. By using three follow-up letters, returns were received from 92 of the 95. Analysis of these data indicated that the 1938 psychologist key was not satisfactory for this group. Only 56% of them received scores of A or B+ instead of the 84% that would be secured if the key were completely appropriate. This difference is statistically significant ($p. < .01$). Analysis of the interest profiles of the five sub-groups showed sufficient differences between the sub-groups to warrant the collection of more data of this sort in order to construct sub-group keys.

The Main Study

For the main study, begun in April, 1948, all male psychologists who had received a Ph.D. before 1943 and whose addresses were listed in the 1948 APA Directory were asked to fill out a S. V. I. B. Three follow-up letters were needed in order to obtain 1048 (89%) usable returns. Analysis of the age and major field of experience of those who had not replied indicated that the sample obtained is not a biased one in those respects.

* This article is based on the writer's Ph.D. thesis done under the direction of Prof. Donald G. Paterson. The thesis is entitled "Differential Interest Patterns of Psychologists," and was completed in June, 1949, at the University of Minnesota.

Each psychologist furnished information regarding his professional experience which made it possible to classify him according to "field" and in most cases according to "function" also. The numbers in each field classification are: 256 experimental, 221 clinical, 154 educational, 115 guidance, 108 industrial, 69 social, 65 statistical, 44 child, and 16 marketing. The numbers in each functional classification are: 295 teaching, 184 research, 146 service, and 128 administration. (There were 315 who were not given a functional classification.)

Profile Analysis

Median scores on the 42 present keys of the S. V. I. B. for these 13 sub-groups are presented in Tables 1 and 2.[1] Psychologists-in-general have median scores of A on the psychologist and public administrator keys; median scores of B+ on the chemist and personnel director keys; and median scores of B on the artist, architect, physician, mathematician, engineer, math and physical science teacher, city school superintendent, advertising man, lawyer, and author-journalist keys.

The rank order correlations between the median profile for all psychologists vs. each of the 13 sub-group profiles are as follows: clinical .98, social .96, child .94, educational .93, statistical .90, experimental .86, guidance .77, marketing .47, teaching .96, service .90, research .86, and administration .81. Marketing psychologists are the most deviant group and their profile shows that they are characterized by stronger sales and office detail interests than other psychologists. Guidance psychologists deviate in the social service direction. Research, experimental, and statistical psychologists are distinguished because of their physical science-biological science interests. Administrators have higher social service and production manager scores than most psychologists. The industrial sub-group differs from psychologists-in-general largely because of stronger production manager and office detail interests. The service sub-group have verbal and social service interests which distinguish them. The other sub-groups (teaching, child, educational, social, and clinical) have median profiles which are very similar to the total group profile.

The 1948 Psychologist Key

A new psychologist key was constructed by contrasting the responses of these 1048 psychologists with those of Strong's 1938 professional men-

[1] To reduce printing costs, Tables 1, 2, and 3 have been deposited with the American Documentation Institute. Order Document 2693 from American Documentation Institute, 1719 N Street, N.W., Washington 6, D. C., remitting $0.50 for microfilm (images 1 inch high on standard 35 mm. motion picture film) or $1.00 for photocopies (6 × 8 inches) readable without optical aid.

in-general group. Strong's method of assigning item weights was followed. This new key differentiates psychologists from professional men-in-general rather sharply. All of the psychologists exceed the mean score for professional men-in-general. The mean standard score for professional men-in-general is 17.5 as compared to 50 for psychologists. In other words, using the standard deviation of the psychologist group as the unit of measurement, the two means are 3.25 standard deviations apart.

All 1048 psychologists were scored on this new key. Except for the marketing psychologists who have a mean score of B+, all the sub-groups have a mean score of A. Social, statistical, child, clinical, experimental, and research psychologists have high A mean scores; service and teaching psychologists have average A mean scores; guidance, educational, industrial, and administrative psychologists have low A mean scores.

All 13 sub-groups score higher on the 1948 psychologist key than they do on the 1938 psychologist key. Industrial, guidance, and administrative psychologists show the greatest increase in scores and experimental, teaching, and research psychologists show the least increase. This means that if an individual has the interests of one of the last three types of psychologists, the 1938 key will differentiate his interests from those of professional men-in-general quite accurately. If, however, he has the interests of an industrial, guidance, or administrative psychologist, the 1948 key is much more likely to give A and B+ ratings and presumably is a better reflection of the interest patterns of present-day psychologists than the 1938 key.

Examination of the item weights for the 1948 psychologist key, presented in Table 3, shows the ways in which the 1048 psychologists included in this study differ from Strong's 1938 criterion group.[2] The 1948 group is more socialized than Strong's group, more interested in, more tolerant of, and more willing to help people, and less interested in mechanical and methodical work and in solitary activity. The 1948 group seems to have more of the interests of an applied psychologist and Strong's group more of the interests of a laboratory scientist. The response weights for the two keys are different in 484 instances. Most of the differences are changes of only one point, but 41 shifts involve differences in weights of two or more points.

The practical significance of the difference between the two keys is indicated most clearly by the scatterplot of individual scores on the two keys, presented in Table 4. The data show that these psychologists tend to score higher on the 1948 key than on the 1938 key. For instance, 217

[2] See footnote 1.

Table 4

Letter Grades of 1048 Psychologists on the 1938 and 1948 Strong Vocational Interest Blank Psychologist Keys

		1948 Psychologist Key							
		C	C+	B−	B	B+*	A	Total	Per Cent
1938 Psychologist Key	A			3	3	21	497	524	50*
	B+			2	8	*34*	114	158	16*
	B		2	3	*22*	45	76	148	14
	B−	1	1	*10*	24	32	19	87	8
	C+	2	*2*	13	12	22	3	54	5
	C	*8*	10	22	17	7	13	77	7
Total		11	15	53	86	161	722	1048	
Per Cent		1	2	5	8	15*	69*		100%

* The difference between the 66% who score A or B+ on the 1938 key and the 84% who score A or B+ on the 1948 key is statistically significant ($p. < .01$).

psychologists score B or lower on the 1938 psychologist key and B+ or A on the 1948 key while only 16 score B or lower on the 1948 key and B+ or A on the 1938 key. These results seem to indicate that the two keys cannot be considered equally valid, and since the 1948 key is based on a larger and more up-to-date sample it is recommended that the 1948 key be substituted for the 1938 key.

New Sub-Keys

Sub-keys were constructed for four of the largest field sub-groups: experimental, clinical, guidance, and industrial psychologists. Since these keys were intended for the guidance of advanced psychology students who might be undecided as to the field in which they should specialize, it seemed that keys which contrasted the interests of each sub-group with the interests of other psychologists would be most useful. Consequently instead of Strong's professional men-in-general group, the 1948 sample of psychologists-in-general was used as a reference point. Actually the reference point was a slightly shifting one as the criterion group in each instance was subtracted from the total group. Strong's method of weighting responses was again followed.

The four criterion groups vary in size from 108 to 256. Although these groups are not as large as Strong recommends, they are large enough to assure reasonably accurate results. Strong has found that keys based on 250 cases are likely to differ from keys based on 500 cases by

only one or two standard scores while keys based on 100 cases are likely to differ from those based on 500 cases by between two and eight standard scores.[3]

The extent to which the sub-keys differentiate the four criterion groups from psychologists-in-general is presented in Table 5. Before analyzing these results, however, it may be well to consider some of the factors which have affected the degree of differentiation secured.

In the first place, since all available members of each criterion group were needed in constructing the key for that group, it was not possible to rescore an independent sample. The separation we have obtained is consequently greater than would be expected for other samples. Secondly, the shifting reference point which we chose to use in this study also tended to increase differentiation between criterion and reference groups.

Table 5

Power of Four Strong Vocational Interest Blank Sub-keys for Psychologists to Differentiate Criterion and Reference Groups

	Criterion Group			Reference Group		Difference Between Means in Criterion S.D. Units	Percentage of Criterion Group Exceeding Reference Group Mean
Sub-key	N	Mean Raw Score	Standard Deviation	N	Mean Raw Score		
Clinical	221	47.5	20.9	827	23.0	1.2	85.1
Experimental	256	42.9	38.8	792	−10.6	1.4	88.7
Guidance	115	50.0	37.6	933	− .1	1.3	91.3
Industrial	108	35.7	29.9	940	− 3.9	1.3	88.0

On the other hand, the fact that all psychologists were forced into one of the nine field classifications has tended to give us less separation than if we had used only those psychologists who clearly fell into one of the classifications. Finally, it should be pointed out that, other things being equal, the smaller the criterion group, the greater will be its separation from other psychologists. This is true because sampling errors can be capitalized upon to a greater degree with a small group than with a large group.

The results reported in Table 5 indicate that these four sub-keys have about equal differentiating power. In all four instances the reference and criterion group means are about 13 standard scores, or 1.3 standard deviations apart, and over 85% of the members of the criterion

[3] Strong, E. K. *Vocational interests of men and women.* Stanford University Press, 1943, pp. 645–646.

groups exceed the means of the reference point groups. These four keys do not secure the extremely sharp separation between criterion and reference point groups obtained by the 1948 psychologist key, but it would seem that they have sufficient differentiating power to warrant their use. Moreover, the four sub-keys have the advantage of being based entirely on recent data while the 1948 psychologist key, since it contrasts the interests of present day psychologists with the interests of a 1938 professional men-in-general group, may be somewhat out of date.

An analysis of the response weights assigned to items for the four sub-keys, presented in Table 3,[4] indicates that clinical psychologists are differentiated from other psychologists by greater artistic, literary, teaching, verbal, and social service interests. Experimentalists have stronger interests in physical science, mathematics, and mechanical work. Guidance psychologists have a stronger preference than others for interviewing, service to others, personnel work, and writing. Industrial psychologists are distinguished by their business interests.

Correlation between Keys

The relationships among the five new keys developed in this study are shown by the following correlations based on a sample of 216 psychologists not included in any of the four sub-key criterion groups. (To be exact these correlations are not between keys but between the scores of individuals on pairs of keys.):

	Psychologist Key	Clinical Key	Experimental Key	Guidance Key
Clinical Key	.30 ± .09			
Experimental Key	.25 ± .09	−.52 ± .07		
Guidance Key	−.32 ± .08	.28 ± .09	−.82 ± .03	
Industrial Key	−.36 ± .08	−.13 ± .09	−.37 ± .08	.54 ± .07

Care must be used in interpreting these correlations. The positive correlation between the clinical key and the psychologist key means that clinical psychologists tend to differ from other psychologists in somewhat the same way that psychologists-in-general differ from professional men-in-general. The positive correlation between the guidance and industrial keys means that guidance psychologists tend to differ in the same way from non-guidance psychologists as industrial psychologists differ from non-industrial psychologists.

[4] See footnote 1.

Conclusions

It is suggested that better guidance for potential psychology students can be given if the 1948 psychologist key is substituted for the present (1938) key, and if consideration is also given to the profile scores for psychologists-in-general now available.[5] It is also suggested that advanced psychology students who are undecided as to the field of psychology in which they should specialize, should take advantage of the four new sub-keys and the profile data for 13 different kinds of psychologists developed in this study.

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[5] The five keys developed in this study have been approved by Professor E. K. Strong, Jr. Interest blanks sent to Stanford University are now scored on the 1948 rather than on the 1938 psychologist key. Engineers Northwest (100 Metropolitan Life Building, Minneapolis 1, Minnesota) is equipped to machine score both the 1948 psychologist key and the four psychologist sub-keys on request.

Kuder Interest Patterns of University Business School Seniors

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This paper reports the findings of an analysis of the mean raw and percentile scores made on the Kuder Preference Record by Indiana University School of Business seniors in the classes of 1947 and 1948. Particular reference is made to the interest patterns which were found to be characteristic of students majoring in the various curricula.

Procedure

The Preference Record was administered to the 975 men and 205 women students in the graduating classes of 1947 and 1948. As a vocational interest inventory it is widely used at the present time for vocational counseling and, to some extent, in selection and placement. It yields scores in nine general areas of preference: mechanical, computational, scientific, persuasive, artistic, literary, musical, social service, and clerical.

The mean raw scores with standard deviations were calculated for each of the total groups by sex and for various sub-groups classed by college major. The means of the students grouped by major were compared with the means of the corresponding scales of the total group by use of the critical ratio technique.

Findings

Table 1 gives the mean raw scores in the nine areas of the Kuder Prefference Record for the total group of business school seniors and for subgroups divided by major subject. Table 2 gives the percentile ranks based upon the mean raw score as given in the published norms for the test. Table 3 gives the raw scores for the women students and Table 4, the equivalent percentile scores.

The comparison of the mean raw scores revealed that the business school seniors studied had varied, and in many cases, markedly different interest patterns (Table 1). The accounting and advertising majors had scores significantly different from the total business school group in all nine areas. All of the advertising scores were significant at the 1%

Table 1

Kuder Preference Record Mean Raw Scores by Major for Senior Men in Indiana University School of Business

Major	N		Mech.	Comp.	Sci.	Pers.	Art.	Lit.	Mus.	Soc. Ser.	Clerical
Total Group	975	M	64.8	40.5	54.7	97.0	39.7	51.4	19.0	69.4	61.1
		SD	18.2	14.8	13.5	19.8	12.7	14.6	9.3	17.0	14.3
Gen. Business	179	M	62.3	40.9	54.1	96.2	40.8	51.8	19.8	69.5	60.8
		SD	18.1	12.7	13.6	19.4	12.5	14.9	8.6	16.4	13.6
Accounting	217	M	67.9*	57.1**	58.3**	84.3—	37.6-	48.4—	17.1—	64.7—	70.3**
		SD	17.4	8.9	11.6	15.8	12.1	13.9	9.5	15.2	13.5
Finance and Banking	37	M	65.7	43.9	53.5	92.9	37.8	56.3**	20.0	67.6	61.1
		SD	17.9	13.1	12.0	24.5	13.3	12.5	10.1	18.5	14.4
Management	138	M	68.6*	37.4—	53.9	96.2	37.3-	49.8	17.6	76.2**	61.5
		SD	19.5	12.4	13.2	16.4	12.0	13.4	8.9	18.2	13.7
Advertising	107	M	59.7—	30.9—	49.9—	104.0**	45.8**	57.4**	21.5**	64.4—	57.0—
		SD	17.2	11.6	14.9	18.4	13.9	16.5	9.3	15.3	13.3
Retailing	109	M	65.4	33.1—	54.7	105.1**	40.7	51.8	17.8	70.0	56.3—
		SD	17.5	11.3	12.1	17.0	12.1	13.6	9.1	17.5	12.5
Sales	136	M	64.0	30.7—	52.3	112.3**	38.8	50.8	20.4	72.5*	55.6—
		SD	18.2	9.8	13.4	12.2	11.3	14.1	8.9	15.2	11.6

Note: In Tables 1, 2, 3, and 4, * indicates a positive difference significant at the 5% level, ** indicates a positive difference significant at the 1% level, - indicates a negative difference significant at the 5% level, and — indicates a negative difference at the 1% level.

Table 2

Mean Kuder Preference Record Percentile Scores of Senior Men by Business School Major

Major	N	Mech.	Comp.	Sci.	Pers.	Art.	Lit.	Mus.	Soc. Sr.	Clerical
Total Group	975	25	72	21	96	29	65	57	70	73
Gen. Business	179	22	74	20	96	31	66	60	70	72
Accounting	217	29*	97**	27**	88—	24-	56—	51—	57—	89**
Finance	37	26	81	18	95	24	76**	61	66	73
Management	138	31*	61—	20	96	23-	60	53	82**	74
Advertising	107	20—	36—	13—	98**	47**	79**	66**	56—	63—
Retailing	109	26	45—	20	98**	32	66	52	67	66—
Sales	136	24	35—	17	99**	27	62	62	76*	57—

Table 3

Kuder Preference Record Mean Raw Scores by Major for Senior Women in Indiana University School of Business

Major	N		Mech.	Comp.	Sci.	Pers.	Art.	Lit.	Mus.	Soc. Ser.	Clerical
Total Group	205	M	47.5	33.2	47.1	80.0	51.2	54.3	22.3	76.9	67.3
		SD	14.8	13.7	15.4	18.1	16.5	14.7	8.6	18.0	18.1
Gen. Business	32	M	46.4	40.2**	50.5	76.5	49.6	54.8	22.4	72.5	72.2
		SD	14.9	13.1	14.0	17.8	13.6	15.3	6.9	18.6	13.2
Management	18	M	46.2	32.6	43.9	84.6	46.4	51.5	21.7	84.6	68.4
		SD	16.9	12.5	12.9	17.4	15.1	11.2	6.8	16.5	12.7
Advertising	30	M	49.2	24.3—	42.0	87.4*	65.1**	57.1	23.2	66.0—	59.3-
		SD	15.3	8.0	13.6	17.8	15.5	12.9	7.9	19.6	16.1
Retailing	24	M	48.7	31.7	43.3	89.7**	53.2	52.0	22.0	73.6	63.0
		SD	16.3	10.2	12.7	15.1	15.4	14.4	7.5	15.8	12.9
Secretarial	26	M	41.5-	30.6	44.9	77.5	48.8	53.4	24.5	79.7	81.9**
		SD	13.6	10.3	17.0	14.9	15.3	14.0	8.0	14.7	16.4
Com'l Teacher	30	M	44.6	35.8	47.0	71.9-	44.6—	51.5	20.6	87.4**	75.5*
		SD	10.5	11.9	14.1	16.1	11.8	11.1	8.9	14.5	17.0

Table 4

Mean Kuder Preference Record Percentiles of Senior Women by Business School Major

Major	N	Mech.	Comp.	Sci.	Pers.	Art.	Lit.	Mus.	Soc. Ser.	Clerical
Total Group	205	48	68	40	87	52	66	46	45	59
Gen. Business	32	45	88**	50	80	48	66	46	35	70
Management	18	45	65	31	92	40	59	42	62	62
Advertising	30	52	35—	21	95*	79**	73	50	23—	40-
Retailing	24	51	62	30	96**	59	61	45	37	50
Secretarial	26	31-	59	34	82	45	64	55	52	81**
Com'l Teacher	30	39	76	40	66-	36—	58	38	68**	76*

level with positive scores in the persuasive, artistic, literary and musical areas and with negative scores in the mechanical, computational, scientific, social service and clerical areas. The accounting group had relatively high scores in the computational, scientific, clerical and mechanical areas with relatively low scores in the persuasive, artistic, literary, musical and social service fields.

Other patterns found included the following: a relatively high literary interest by the finance group; positively significant social service and mechanical scores for the management with negatively significant scores in the computational and artistic areas; one positively significant score, in the persuasive area, for the retailing group with negatively significant scores in the computational and clerical areas; and a persuasive-social service pattern for the sales group with negative scores in the computational and clerical areas.

It is important to note that these observed patterns are based on differences in the mean raw scores and not on percentile scores. For example, the mean raw score of the advertising group in the artistic area was significantly higher at the 1% level than the mean score of the total group, yet the corresponding percentile score was only 47 (Table 2). Similarly, the mean score of the accounting group in the persuasive area fell at the 88th percentile, yet it was significantly lower than the mean score of the base group.

Similar but less marked patterns were found for the women seniors (Tables 3 and 4). Judging from the number of significant scores, the women students majoring in advertising had the most definite interest pattern with significantly high artistic and persuasive scores and low computational, social service and clerical scores. Students studying to be commercial teachers had four significant scores, high social service and clerical and low artistic and persuasive. Contrasted with this pattern was that of the secretarial students with a high score in the clerical area and a low score, significant at the 5% level, in the mechanical area. As in the case with the men, the women retailing majors had only one high score, in the persuasive area.

The general business majors had the highest score in the computational area and the lowest score in the persuasive area of any of the subgroups. Their score in the clerical area was third high, being below the secretarial and the commercial teacher groups. Thus their pattern followed very closely the pattern of the male accounting majors.

An extremely high persuasive percentile score, based upon the general norms, was found to characterize all of the groups with the possible exception of the commercial teacher group (Tables 2 and 4).

Summary

The Kuder Preference Record revealed significant differences in the interest patterns characterizing senior students majoring in the various curricula in the Indiana University School of Business. In practically every case the interest patterns for the various groups followed those set

up for related occupations by the test manual. The need for establishing local norms and for analyzing percentile and raw scores carefully was emphasized by the deviation of the business school group from the general group used for establishing the published norms.

The findings indicate that the Kuder is a useful tool in assisting students to choose a major within a school of business.

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An Analysis of Certain Factors in Serious Accidents in a Large Steel Plant *

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The group selected for study was comprised of the 100 most recent accident reports, beginning with the date upon which the study began. Starting with a case dated March 14, 1947, each accident was taken in reverse chronological order until 100 had been recorded. Case number 100 is dated February 20, 1944. The 100 accident records obtained in this manner thus include all major accidents at the Armco Steel Corporation's Middletown Division over a period of approximately three years.

For comparison with these cases, a "control," or accident-free group of two hundred cases was selected from men and women who had worked on the same jobs during the same period of time, but who had not had a major accident in that time. From the accident group reports a list of jobs on which accidents had occurred and the frequency of accidents on each was compiled. The foreman of each of the departments which was listed as having had one or more accidents in the three-year period was then contacted, and from these men the names of two accident-free men for each accident case listed was obtained. For example, the Repairmen Section of the Maintenance Department was found to have the greatest frequency, with twelve accidents; so the names of 24 accident-free men were obtained. In the case of the Masonry Department, where one bricklayer had been injured, the names of two bricklayers who had not been injured were obtained. This procedure yielded a group of 200 men and women who had worked without accident on the same jobs during the same period of time as had the 100 men and women listed as accident cases.[1]

For all individuals, the following information was transcribed from the company records to a specially prepared data sheet: (1) name; (2) check number; (3) age; (4) marital status; (5) dependents; (6) average weekly wage; (7) World War II veteran; (8) physical rating—as decided

* The data treated in this study were obtained from the records of the ARMCO Steel Corporation, Middletown, Ohio. This corporation accorded the writers fullest cooperation in opening their files and supplying much advice and assistance.

[1] Because one job on which there had been an accident has been since discontinued, the control group actually consists of 198 cases.

by the company doctor at the time of employment; (9) height; (10) weight; (11) blood pressure; (12) vision; (13) test scores,—a. Otis Test of Mental Abilities; b. Bennet-Frye Mechanical Comprehension; c. Bernreuter Personality Inventory; all six percentile scores;—(14) education; (15) company service; and (16) job service.

For the accident cases, the following additional data were transcribed on the record sheet: (17) date of accident; (18) day of week; (19) time of day; (20) amount of shift worked; (21) whether doing usual job; (22) job when accident occurred; (23) classification of accident,—a. days lost, b. part of body injured, c. type (crush, burn, cut fracture, etc.), d. disability (temporary total or partial, permanent total or partial, or death); (24) description of accident; (25) how it happened; (26) why it happened; (27) cause; (28) responsibility; and (29) previous major accidents, if any, and classification.

Because the records of height, weight, blood pressure, and vision had often been made months or years prior to the accident, it was not considered feasible to include these variables in the investigation and they were not considered.

The test scores (Item 13 above) were not available on all cases because testing did not begin until 1942 and many of the men with whom this study is concerned were in the employ of the corporation prior to that date. Among the accident cases, 47 individuals had taken two or more of the tests. Among the control individuals, 62 to 65 had taken two or more of the tests.

The company reports of major accidents are divided into three groups on the basis of responsibility. This responsibility is determined by an accident investigation committee which meets as soon as possible after the occurrence of the accident. In the present study, the total group of accident cases was divided on the basis of the committee's decision into the following subgroups: A—those who were totally responsible for their accidents; B—those who were jointly responsible for their accidents; C—those who were injured by the action or lack of action of someone else.

Results

Non-test Data. No item of non-test data was found to differentiate significantly between the accident and accident-free groups. This was found true not only for each subgroup among the accident cases as divided according to responsibility, but also for certain subdivisions of the control group made on the basis of length of company service. Table 1 summarizes these non-test data.

Mechanical Comprehension and Otis Test Scores. These two tests failed to reveal any significant relationship to the occurrence of accidents.

Inspection of the Otis Test scores seemed to indicate that these scores increased in the control group with age and company service. An analysis of variance applied to these scores in terms of Age and Service demonstrated that the variance was significantly related in approximately equal amounts to both of these variables. The possibility is therefore not excluded that, were it possible "experimentally" to equate the accident and control data with regard to age and service, a relationship to Otis Scores might be found.

Table 1

Mean Values for Non-test Data

Group	Age	Dependents	Weekly Wage	Company Service (days)	Education
Accident A	39.0	2.00	$52.92	3255.5	7.84
Accident B	31.8	1.87	48.91	2168.9	8.94
Accident C	34.9	2.00	49.42	3251.4	8.73
Control	41.8	2.82	57.80	5128.0	7.88

Bernreuter Personality Inventory. The company records available to the present writers presented the Bernreuter scores in terms of percentiles. For the purpose of statistical computations, these scores were converted into T-score equivalents. Table 3 shows the means and standard deviations for each of the six Bernreuter scales. The writers are fully aware of the hazards in interpreting the scores of personality measures which have been obtained in industrial situations. It is quite probable that applicants for a job will give what appears to them to be a "correct" answer on such an inventory, rather than an answer which may reveal their real opinions of themselves. It should therefore be kept in mind when reading the following discussion, that the terms alluding to personality traits are employed for convenience in identifying the scales according to the system employed by the author of the inventory, and it

Table 2

Mean Test Scores by Accident Groups

Accident Group	Mech. Compr. Score		Otis Score	
	N	M	N	M
Accident A	9	30.9	10	82.9
Accident B	17	33.3	17	93.4
Accident C	21	31.3	21	87.8
Control	62	34.0	64	84.5

should not be implied that the writers believe the scores to be truly representative of any unitary personality trait.

Some of the mean differences between accident and control groups, computed from data summarized in Table 3, were found to be significant when Fisher's *t* test was applied. On the Bl-N scale (neurotic tendency) the mean T-score for Accident Group A was significantly lower (less "neurotic") than the control group at the 5% level of confidence (*t*: 2.06). The same comparison between control group and Accident Groups A and B combined yielded a significant difference at the 1% level. Closely comparable results were obtained for the B3-I scale (introversion-extroversion). One further significant difference was found: between Accident Groups A and B combined and the control group for the Fl-C scale (confidence in oneself), the mean for the combined accident groups being significantly lower (more "self-confident") at the 1% level.

Table 3

Mean T-Score Equivalents of Bernreuter Personality Inventory

Group	N	M	SD	M	SD	M	SD
		B1–N		B2–S		B3–I	
Accident A	10	40.2	6.73	49.8	6.34	39.0	6.00
Accident B	17	36.9	8.02	48.9	8.02	36.5	8.84
Accident C	20	43.1	8.96	50.6	5.95	41.4	7.86
Control	65	45.3	7.61	48.0	6.60	43.4	6.60
		B4–D		F1–C		F2–S	
Accident A	10	52.5	5.41	42.9	7.23	42.6	6.40
Accident B	17	52.9	7.12	41.5	9.39	38.7	6.16
Accident C	20	51.6	6.43	43.1	9.16	48.9	6.07
Control	65	49.1	6.69	46.4	8.35	44.1	6.22

An inspection of the means in Table 3 reveals that among the first four scales the accident groups present alternately higher and lower values as compared with the control group. The writers examined the individual data for each scale, and discovered that individuals who were considered totally or partially responsible for their accidents seemed to have wider discrepancies in their scores from one scale to the next than did those individuals who were accident-free or not considered responsible for their accidents. This feature of the data was most evident when the B3-I and B4-D (dominance-submission) scales were compared. By subtracting the B3-I score from the B4-D score for each individual, difference scores were obtained which were preponderantly positive for Groups A and B—only one in Group A and three in Group B were zero or negative. On the other hand, 22, or one-third, of the cases in the control

group showed zero or negative differences between these measures. The mean difference scores for Groups A, B, C and control were 14.0, 16.5, 9.8 and 5.9, respectively. The means for Groups A and B are each significantly different from the control group at the 5% level or better. While there is considerable overlap among difference scores of the various groups, there does appear to be a significant trend for accident cases to have higher B4-D scores ("dominant") and lower B3-I scores ("extroverted").

Summary

From the accident report records of the ARMCO Steel Corporation, Middletown, Ohio, data were collected on 100 accidents which occurred over a three-year period ending in March 1947. Besides the accident data, personal data and test scores (where available) were obtained for these individuals and for a control group composed of two accident-free employees for every accident case. A statistical analysis was made with the following results:

1. In this particular study, none of the "non-test" data was found to differentiate between the accident and control groups.

2. Mechanical Comprehension and Otis Intelligence Test scores were not found useful for accident prediction purposes, but the Otis was found to be greatly affected by age and company service.

3. Three of the Bernreuter Personality Inventory Scales seemed to differentiate to some degree between accident and accident-free groups. In the nomenclature of this Inventory, the accident cases appeared less "neurotic," less "introverted" and more "self-confident." Especially noteworthy was a tendency among the accident cases to have high B4-D (dominance) scores and at the same time low B3-I (extroversion) scores. In view of the wide overlap among groups in these measures, and also considering the rather speculative nature of personality assessment by means of inventories, evidence of this sort can hardly be taken as a reasonable basis for exclusion from employment. Nevertheless it does suggest that employees who conform to the "personality pattern" of such accident cases should be subject to closer scrutiny when placed on jobs involving the possibility of serious injury.

The small number of cases studied here, and the limitation of the study to one industry, necessarily limit our conclusions to suggestions for further study. It is definitely believed that the variability among Bernreuter Personality Inventory scores would make a profitable subject for further study with a large number of cases.

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Visual Performance and Accident Frequency

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The importance of adequate vision as a safety factor has received increased recognition from industrial safety engineers in recent years. Numerous studies have pointed out the desirability of requiring industrial job applicants to meet minimum safety visual requirements at the time of employment. In some instances these studies have shown decreases in injury frequency following the introduction of such employment standards.

This paper summarizes the results of a recent experiment in a light manufacturing industry. The data confirm previous evidence that low visual performance and injuries frequently go hand in hand. In this case the use of a minimum visual safety standard for employment on all factory jobs probably materially reduced injury frequency and compensation costs.

Procedure

The medical and accident records in a large optical company were examined and employees who had experienced three or more injuries [1] in the previous 18 month period were identified. These were considered "high frequency of injury" employees compared with the average experience in this plant. It was planned to compare the visual performance of this group with that of an injury free group to see whether there were any significant differences.

Age, education, experience and the job hazards have all been shown to be related to injury susceptibility (**1**, **3**, **5**, **6** and **8**). In setting up the injury free or control group these factors were therefore carefully controlled. This was done by matching each employee in the accident group with an employee on the same job, and having the same age,

[1] Types of injuries included were: fractures, bruises or contusions, sprains, cuts, abrasions, slivers, etc., or any other types of injuries that could possibly have been caused by low visual performance. Such injuries as hernias and back strains were not considered for the purposes of this study.

education and experience, but who was "accident free" during the 18 month period used for the study. This group of "accident free" employees made up the control group.

It was also necessary to make sure that none of those included in the two groups had received professional eye attention during the 18 month period of the study since such eye care undoubtedly would improve visual performance which might in turn have reduced the employee's injury susceptibility. Since complete eye examination records were available on most employees in the plant's own eye clinic, it was possible to determine in most cases in advance of testing which employees had received professional eye care in this time. As an additional check after the pairing was completed and the testing begun, each subject was questioned carefully concerning the last date eye care had been obtained. Where either one of the pair had received professional eye attention during the previous 18 month period, the pair was dropped from further study. After this last control had been applied 42 matched pairs remained, a total of 84 employees participating in the experiment.

The visual performance of each individual was tested on the Bausch & Lomb Ortho-Rater (**4**), a precision instrument measuring the visual skills listed in the first column of Table 1.

On completion of the visual performance testing, means were computed for the raw scores of each group on the vision tests. Critical ratios were also computed to determine the statistical significance of any existing differences (**2**). Both means and critical ratios are shown in Table 1 in comparison with those obtained in a similar study conducted in a heavy industry (**7**).

Results

Table 1 shows that on the average, the injury free group of employees had superior visual performance.

In three visual skills—acuity worse eye (near vision), acuity, right eye (near vision) and color perception, differences exceeded the 5% level of significance. In Stump's study (**7**) the critical ratios were high for several distance visual skills, but very low for near visual skills. This may be due to the fact that on the jobs in a heavy industry, distance visual skills are more frequently required in performing the job. On the other hand, for the jobs covered by the present study in the optical industry, near visual skills are essential and are therefore important for safety.

These studies would seem to indicate that somewhat different patterns of visual skills may be required for safety on various jobs in different industries. Each plant should probably conduct its own investigation

Table 1

Mean Ortho-Rater Visual Performance Scores and Critical Ratios of Injury Free and High-Frequency-of-Injury Employee Groups in Two Independent Studies

Tests	Study No. 1 (Heavy Industry, see Stump (7))			Study No. 2 (Light Industry, present study)		
	A Injury Free Group Mean Score	B High Frequency Group Mean Score	Critical Ratio M_A–M_B	C Injury Free Group Mean Score N = 42	D High Frequency Group Mean Score N = 42	Critical Ratio M_C–M_D
1. Vertical Phoria (Far)	5.56	5.25	1.02	5.49	5.48	0.00
2. Lateral Phoria (Far)	7.44	6.72	1.25	8.29	8.00	0.51
3. Acuity, Both Eyes (Far)	10.81	10.14	1.69	9.90	9.68	0.68
4. Acuity, Right Eye (Far)	9.89	8.83	2.26**	9.67	8.43	1.95
5. Acuity, Left Eye (Far)	9.86	8.67	2.08**	9.69	9.26	0.86
6. Acuity, Better Eye (Far)	10.53	9.72	2.21**	10.36	9.81	1.67
7. Acuity, Worse Eye (Far)	9.25	7.78	2.56**	9.00	7.86	1.73
8. Depth (Far)	5.64	3.53	3.27*	5.55	4.74	1.41
9. Color (Far)	4.44	4.25	0.60	4.93	4.43	2.14**
10. Acuity, Both Eyes (Near)	11.08	10.69	0.87	8.93	8.38	1.38
11. Acuity, Right Eye (Near)	9.03	8.58	0.70	8.86	6.88	2.95*
12. Acuity, Left Eye (Near)	9.61	9.28	0.57	9.00	7.93	1.59
13. Acuity, Better Eye (Near)	10.00	10.03	0.05[3]	9.62	8.95	1.52
14. Acuity, Worse Eye (Near)	8.64	7.86	1.24	8.24	5.88	3.36*
15. Vertical Phoria (Near)	4.61	4.61	0.00	4.60	4.50	0.32
16. Lateral Phoria (Near)	6.33	7.14	1.02[3]	7.83	7.83	0.00
Mean Age	—	—	—	41.8	41.8	—
Mean Education (Grades Completed)	8.53	9.00	0.90[4]	8.21	8.24	.08[5]
Mean Experience (Years on Job)	—	—	—	9.45	7.67	1.08

* Significant at 1% level or less.

** Significant at 5% level or less.

[2,3,4] These critical ratios were computed from M_B–M_A.

[5] This critical ratio was computed from M_D–M_C.

on a fact finding basis to determine what visual skills are required for safe operation, and establish visual safety standards accordingly.

Further examination of Table 1 reveals that in general the level of visual performance of the workers studied in the first experiment was considerably higher than that of the workers in the present study. This could be due to a difference in the average age levels of the individuals sampled in each study, to job differences, or differences in the sources of employees (8).

Value to Management

Since 1943 visual safety standards have been in use in this company for selection and placement of new applicants, and referral of present employees for eye care. During this entire period compensable accident costs have steadily decreased compared with the previous four year period. Due to the fact that changes in safety procedures are constantly taking place in all progressive plants interested in safety, it is, of course, difficult to ascertain how much, if any, of a decrease in injuries or accident costs can be attributed to one specific part of the overall program. Since the addition of the vision program was the only major change in the safety procedure in the plant studied during the period of this investigation, it is probable that it played a substantial role in the reduction of direct compensation costs by an average of $16,600 per year, which occurred over a four year period. Studies of small groups of employees in the factory have shown a definite decrease in injuries after professional eye attention. Further investigations of the effect of eye care on reduction of injuries are now in progress.

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Attention and Involuntary Movement

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In a situation such as automobile driving, how important is involuntary movement? To what extent is uncontrolled movement different with fixed and with shifting attention? To what extent is two-armed driving more steady and controlled than is one-armed driving? It is not sufficient to know that certain conditions are important for safety. It is desirable to know as accurately as possible to what extent certain conditions modify the control of activities in the total behavior of individuals who are involved in skilled work or in what may be dangerous occupations. Although inferences cannot be made directly from laboratory experiments to such activities as automobile driving, it is believed that the following experiments may throw some light upon the problems.

Two experiments have been performed for the purpose of discovering quantitatively the effect of certain conditions upon involuntary movement. The involuntary movement chosen was finger tremor, arm extended with no rest, since that can be accurately measured in three dimensions with the writer's finger tromometer.[1] The two conditions especially used were distractions with attention held upon a fixation spot without any shifting, and, second, the effect of distractions when the attention shifted.

Experiment 1 Involuntary Movement with Fixed Attention

This experiment was performed in the dark room with the light dimmed to one foot candle. The distractions were an automobile horn from a Ford automobile, actuated by six volts, and the bright light from a Plymouth automobile, actuated by a current of six volts. The horn was in a box about five feet in front of the *S*, where it could not be seen. The light was placed about ten feet in front of the *S* slightly to the left and arranged so that it could easily be moved in any direction and shone into the eyes of the *S*. The finger tromometer was on the table directly in front of the *S* and a fixation spot about six feet in front so that the *S* could look over the top of the tromometer and fixate the spot.

[1] Edwards, A. S. The finger tromometer. *Amer. J. Psychol.*, 1946, 59, 273-276.

Procedure. Standard procedure was used with the tromometer, the *S* being allowed to rest before the measurements began, and the measurements consisting of the sum of the three readings—front-back, right-left, up-down. The time of measurement was thirty seconds.

The first control measurement was made before any distractions were used, and then measurements were taken while either the light or the horn, or both, were used as distractions. Following these three experimental measurements, a second control measurement was made. When the light was directed into the eyes of the *S*, or the horn was blown, the time consumed by the distraction was approximately twenty of the thirty seconds. Order of stimuli was varied so that each stimulus—light, sound, or both together—appeared with varying *Ss* as either first, second, or third stimulus. The order of stimulation was recorded for each *S* so that not only could the results of each stimulating condition be studied, but also the effect of the stimuli as regards order, namely, first, second, or third, could be studied.

Subjects. One hundred *Ss*, unselected college students, half men and half women, were used in this experiment. The ages were 17 to 25. The *Ss* were asked whether they had been in any accidents, automobile or other, and notes were made as to such accidents, their number and seriousness.

Instruction. The following instruction was used: "Lean back comfortably; both feet on the floor; hold your hand as steady as you can, and watch fixation spot during the testing."

The sound of the horn was probably somewhat louder and more disturbing than is found in traffic, and the automobile light shining into the *S's* eyes was closer and probably brighter than is usually found in actual driving situations. *Ss* sat about five minutes before the experiment began.

Since it might soon become known among students that sound and light distractions were being used, conditions were made as equal as possible for all *Ss* by telling them at the beginning of each series of measurements that there would be a control measurement, light and sound distractions, one or both; after the last measurement with distraction another control measurement was taken to compare with the first control.

Results. Detailed results were worked out with means, medians, standard deviations, sigma of the mean, Q_1 and Q_3. Analyses were made for men and women separately, both for the light stimulus and sound stimulus, and both together, and for the first, second, and third stimulus. This permitted finding out first whether greater effect might be found in finger tremor because of the sound, the light, or both, and second, whether the first, the second, or the third stimulus had more effect.

It was somewhat surprising to find that on the average there was no statistically significant increase in finger tremor. Both stimuli together had no appreciable effect greater than one of the distractions alone. Whereas it might be expected that the first distraction might be more disturbing and the later ones less, or, that with the second and third distractions the *S* might become more upset, neither result appeared. With all the averages running from about 37 to not quite 43 mm., the greatest increase in finger tremor caused by the distractions was for the men 8 per cent and for the women 9 per cent. None of the critical ratios between the means was significant for the entire experiment, the highest being 0.66, which indicates results not much better than chance.

It might be expected that those students who had been in automobile wrecks or who had had serious traumatic experiences would be more disturbed than the others. No such evidence was found. Some of those who had been in the worst accidents had the lowest finger tremor throughout the experiment.

The only positive results that can be stated are in the cases of a few exceptional students who were very greatly disturbed and who showed greatly increased finger tremor during one or all of the experimental measurements. Of these *Ss*, and considering those whose finger tremor was increased 50 per cent to more than 100 per cent, there were 16 men and 12 women.

Of the 16 men considerably affected by sound, light, or both distractions together, it appeared that both distractions together affected the men most and most frequently, 12 of the 50; sound affected very considerably 6, and light 4 of the 50 men.

Of the 12 women considerably affected by the distractions, only 5 were greatly affected by both distractions together; 9 by sound, and 6 by light. It is to be noted that some of the 16 men and some of the 12 women were greatly affected by more than one of the distracting stimuli.

Considering the order of distractions, first, second or third, for the 16 men and 12 women greatly affected, 6 men were most affected by the first distraction, 6 by the second, and 4 by the third. Of the 12 women, 5 were most affected by the first distraction, 6 by the second, and only 1 by the third.

Taking these cases and our averages for the 100 *Ss* altogether, there is no evidence that two distracting stimuli cause more involuntary movement than one of them alone; or that a series of distractions cause more disturbance in involuntary movement than do a first or second disturbing distraction.

It may also be noted that there is no evidence of a general build-up of disturbing influence caused by a series of three disturbing stimulus

situations. This is, of course, not without exceptions in certain of the *Ss*. But the first control average was 38.29 mm. and the second control average following the distractions was only 39.46, an insignificant difference of only 1.18 mm.

Conclusions. It appears from this experiment with steadily fixed attention that, with certain exceptions (16 of the 50 men, and 12 of the 50 women), students selected at random and irrespective of experience with accidents showed on the average no statistically significant increase in finger movement under conditions which were assumed to be considerably distracting and might have been expected to be quite disturbing.

On the other hand, 32 per cent of the men and 24 per cent of the women had very considerable increases of involuntary movement.

Considering all of the cases and the specially disturbed *Ss* altogether, there is no evidence that the two disturbing stimuli were more disturbing than was one at a time; nor that the third distraction had any more effect than the first or second.

There was no build-up of disturbing effect since the first control experiments and the last showed no significant difference in average.

Some suggestion appears from this experiment to corroborate what we already know, namely, the importance of fixed attention in connection with motor control.

Experiment 2 Involuntary Movement with Shifting Attention

In this experiment conditions were changed in several ways. Preliminary tests were made with the same set-up described in Experiment 1, but with the instruction to *S* to shift attention and to look sideways during the measurements. The preliminary experiments indicated decidedly different results and led to the development of an experiment in which the steering wheel of an automobile was fastened to two units (front-back, right-left) of the tromometer. The steering wheel was mounted so that it was at the height and angle of the steering wheel in a car. The tromometer was placed so that the top of the steering wheel was between the two units of the tromometer that were used for measurements. Movement of the wheel thus moved one of the riders on the tromometer. Movement in the opposite direction moved the other rider. In this set-up the control experiment might have practically or almost zero recorded, because with both hands on the wheel it was possible to hold it very steady. Also, two riders instead of three were engaged. All measurements, both control and experimental, were thus very much reduced.

Procedure. *S* was given time to rest before the control measurements were taken. He was told that during the experiment he was to remain

as steady as possible, to keep his feet flat on the floor, and to keep his eyes on the fixation point unless told otherwise. He was to be as comfortable as possible in the chair which was placed at a comfortable position for the *S* for holding the wheel. The first control measurement was made with *S* placing both hands on the wheel and holding his attention steadily on the fixation spot, which was three feet in front of him. Time of measurement was thirty seconds. After *S* had rested, the first experimental measurement was taken; *S* was in the same position as in the control measurement, but after fifteen seconds he was told to look out of the window, which was six feet to his right. After four seconds *S* was told to look back at the fixation spot. The second control measurement was taken with only one hand on the steering wheel. *S* was told to use the hand with which he wrote, and to hold attention steadily on the fixation spot. The next experimental measurement was made with one hand on the wheel, but after fifteen seconds *S* was told to look out of the window. After four seconds *S* was told to look back at the fixation spot. The third experimental measurement was made by having *S* hold both hands on the wheel, but after fifteen seconds *S* was told to take the pencil which was handed to him by *E* and then to put his hand back on the wheel. The pencil was handed to him at a distance of two feet. There were thus two control and three experimental measurements.

Subjects. In this experiment there were 60 men, aged 18–35, and 40 women, aged 18–24, all college students selected at random.

Results. The results in this experiment are in direct contrast with those of Experiment 1. For the 100 students, with the men and women studied separately, the effect of shifting attention was great and consistent, all differences with definitely significant critical ratios, 2.526 to 9.71. For the men, the means showed an increase from the first control to the first experimental situation on the average from 3 mm. to 4.6 mm. The second control was 6.18; the second and third experimental ratings 9.05 and 14.48 respectively. For the women, the increase from control to first experiment was from 2.38 mm. to 2.85, and from the second control of 4.53 mm. to third and fourth experimental measurements 6.93 and 11.7. The smallest percentage increase was 40 and the largest percentage increase was 158. The average percentage increase for all *Ss* was 80.9; for men, 82.25, for women, 79.5. See Figure 1.

But compared with the first controls (both hands on the wheel and fixed attention) other conditions showed increases of uncontrolled movement of 300 to 400 per cent. On the basis of the averages, and taking the first control series for the men and for the women, shifting the attention to reach and take a pencil increased involuntary movement for the men, 4.46 times, and for the women, 4.91 times. If so great increase of

involuntary movement takes place in the relative quiet of the laboratory, how much is to be found under the more disturbing conditions of actual automobile driving?

Reference to Figure 1 also shows a very significant difference in control, when only one hand is used instead of two. The uncontrolled movement is about twice as great.

Conclusions. With shifting attention and slight distraction (no bright lights or loud sounds), the increase in involuntary hand and arm movement was large, consistent, and statistically significant. Although one cannot draw conclusions directly from these experiments to what may be expected to happen in such a situation as driving an automobile, the question is raised as to how much danger exists in driving on account of

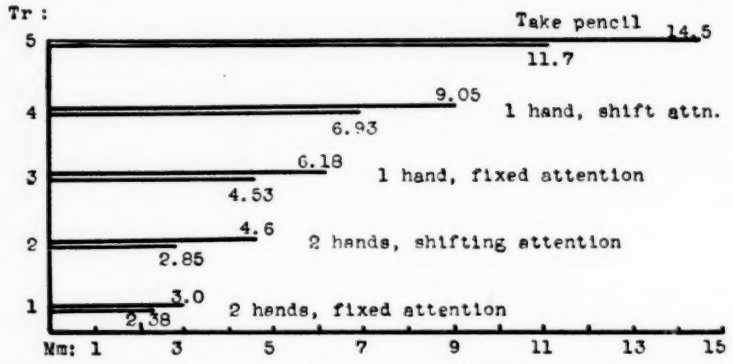

FIG. 1. Increased hand and arm movement with shifting attention. Tr indicates the series of trials: 1, the first control series; 2, the first experimental series; 3, the second control series; 4 and 5, the experimental series that followed 3. Horizontal lines are in mm., the upper line for men, the lower for women. There were 60 men and 40 women. The C.R.'s between means were all from 2.526 to 9.71.

involuntary movement over which the driver has no control. We may perhaps surmise that with the varying conditions of driving or of similar occupations, the varying amounts of monotony, emotional excitement, and various distractions might produce much more uncontrolled movement than we have found in the laboratory.

Considering the two experiments together it appears that hand and arm steadiness are relatively great with fixed attention; and that involuntary movement is relatively great when attention is shifting, especially when one is using one hand for a second operation.

It also appears that in a considerable number of cases involuntary movement of considerable amount may occur even when there is steadily fixed attention.

The great increase of uncontrolled movement when only one hand is used is of no small significance for automobile driving in traffic.

Practical Implications

Although it is clear to those who are informed that individuals suffering from certain abnormal conditions such as epilepsy and general paresis should not be permitted to engage in occupations where uncontrolled movements might happen, it has not been clear that there are so-called normal individuals and so-called normal situations that should require limitation of occupation in the interest of safety to self and to others. A more accurate and thorough knowledge of the involuntary movements that may occur with easily disturbed individuals and for practically all "normal" people under certain disturbing conditions may well find place in connection with our industries, automobile driving, and in other situations which demand steady neuro-muscular control. Too little is known and known accurately about the relation of involuntary movement to the total behavior pattern.

The question is forcibly raised: How dangerous is the one arm driving of automobiles?

Received January 17, 1949.

Book Reviews

Burtt, Harold Ernest. *Applied psychology.* New York: Prentice-Hall, Inc., 1948. Pp. x+821. $7.35.

Burtt says: "This book is intended for two types of readers: the college student who has had an introductory course in psychology and desires orientation toward the science in its practical aspects, and the layman who is concerned with the general scope of applied psychology and possibly with a particular interest in some limited phase of it" (p. vii).

The author meets the needs of both audiences very well, for the materials are presented in a straightforward, factual way; and he comes to the assistance of those who have not had an introductory course in psychology by presenting in the second chapter a sort of "reader's digest" of such a course. Most statistical concepts are also avoided, and only those are employed which are essential for a first book in applied psychology.

After brief introductory remarks, followed by the resumé of general psychology, the remaining twenty-four chapters (consisting of 775 pages) seem to fall into the following categories: pseudo-psychology (astrology, spiritualism, graphology, phrenology, physiognomy, etc.); educational psychology, including individual differences and problems of learning; personal efficiency; vocational guidance; psychology in medical practice, and in psychotheraphy; legal psychology, especially as related to problems of testimony and crime; business and industrial psychology, e.g., tests, industrial efficiency, fatigue, accidents; morale; the psychology of advertising, including consideration of advertising appeals and media; and a concluding chapter on "outlying fields."

In this last chapter are discussed: art, music, poetry, recreation and athletics, public speaking, writing, drama, moving pictures, radio, the press, public opinion, politics, religion, war, and peace. And all of this is done in 36 pages! This indicates the one general criticism of this textbook—that such important topics of applied psychology are so cursorily handled, while other subjects, such as crime detection and prevention, are dealt with at such length. Incidentally, the four chapters devoted to legal problems seem to be very largely a condensation of Burtt's book on *Legal Psychology* published in 1931.

Several important concepts are presented so briefly that the readers, of the kind to whom the book is addressed, will probably get erroneous notions of what the terms imply. Examples are retroactive inhibition (p. 127) and the psychoneuroses (pp. 258–260), although it must be ad-

mitted that it is difficult in any introductory or elementary book to do more than give readers a broad, general acquaintance with the field.

On the whole, the book is a good analysis of some of the more important areas of applied psychology. The addition of questions or other study aids at the end of each chapter would have been welcome for students; and it is unfortunate that no names of authors are given in the Index.

Steuart Henderson Britt

McCann-Erickson, Inc.
New York City

The OSS Assessment Staff. *Assessment of men: selection of personnel for the Office of Strategic Services.* New York: Rinehart and Co., 1948. Pp. xv+541. $6.50.

Whereas World War I produced one military personnel program in which psychologists played a crucial part, World War II produced four major and at least as many minor programs. Those of the Army Air Forces and of the Navy's Bureau of Personnel have been described in detail in volumes edited by Flanagan and his collaborators and by Stuit and his associates; the work of the psychologists in the Adjutant General's Office of the Army and in the Navy's Aviation Psychology Section of the Bureau of Medicine and Surgery has been described in scattered papers in the professional journals. And now Donald Fiske, Eugenia Hanfmann, Donald MacKinnon, James Miller, Henry Murray and others have made available in this volume a detailed account of the philosophy, methods, and results of the personnel selection program of the Office of Strategic Services.

This volume is as distinctive in literary style and as easy to read as any treatise by specialists in fantasy should be; it is as full of insights into personality structure and measurement as one would hope from personologists and clinicians; and it reveals the quick grasp of practical matters which was demonstrated time and again during World War II by academic and laboratory psychologists who turned to the practice of psychology. We might ask, What was the unique contribution of this group of World War II psychologists to personnel psychology?

The orientation of these psychologists was unique for, unlike the other groups working on personnel selection, known to this reviewer, this one included practically no personnel psychologists: they were laboratory men or clinicians, their interests were in personality theory and in psychotherapy. They therefore approached a personnel assignment with a freshness and originality, with a freedom from attachment to existing methods, which resulted in unusual creativity. Among the innovations

are a willingness to use subjective methods as a supplement to objective tests, the development of projective and situation tests, and the routine use of the intensive case conference. At the same time, lack of familiarity with the principles and practice of personnel psychology resulted in some unnecessary mistakes and in some "findings" which have long been familiar to workers in the field. To cite just one of several possible examples, despite an excellent analysis of the complexity and unreliability of their own criteria, they state (on page 397) that "If the job is running a lathe in a large factory the rate of piece-work production is a satisfactory criterion . . .," whereas various studies have shown that even as "objective" a criterion as output may be an unreliable and invalid index of a worker's success.

The organismic as opposed to the elementalistic approach to measurement is described and evaluated in detail, for perhaps the first time in a practical situation. Many of the techniques used by the OSS Assessment Staff were not new, and were not proclaimed as new, but they were thoroughly tried, revised in the light of experience, written up in detail, and statistically analyzed. The psychologist or personnel worker interested in the testing possibilities of social and practical situations, or in the use of the interview and of the case conference in evaluating leadership ability or ability to adjust to trying situations, will find many worthwhile suggestions in this account of the trial of these methods. This source is unusual among clinical studies, because the Assessment Staff was self-critical, checked for personal and systematic bias, and made all possible statistical analyses of their data as their work progressed.

The *organismic* method attempts to predict future behavior by inductive thinking from a set of observed facts to a conception (the hypothetical formulation of a personality), and then inductively to predict behavior in an anticipated situation, whereas the *elementalistic* approach attempts to predict future facts directly from observed facts.

It is especially interesting to compare the conclusions concerning the relative validity of the two methods reached by the authors wtih those of some workers in one of the other major personnel selection programs of the Armed Forces. The OSS psychologists state on page 227: "It is the contention of S (one OSS unit) that more can be learned of people by being with them as 'good Joes' than by testing them as professors." (Perhaps the reviewer will be pardoned for stating that this seems to him to be the discovery of someone who has previously done his testing as a professor, a laboratory man or clinician detached from the situation into which he injects his tests, rather than the wisdom of a person who has worked in a practical situation, who has used tests as only one method of gathering data, and who has had to be a "good Joe" all along in order

to do any kind of testing!) In contrast with this statement concerning the superiority of observational and projective techniques, one should consider the conclusions drawn from military testing experience by factor analysts such as Guilford in a recent article in the *Psychological Review*, proposing a selection procedure which is even more elementalistic and quantitative in its details than the traditional methods decried by the organicists of the OSS. There is no space in this review to explore these conflicting views, but they should be mentioned in juxtaposition, and some comparative data cited.

The OSS authors state that no adequate comparisons have been made between organismic and elementalistic approaches, but a few inadequate comparisons could be made. The AAF Aviation Psychology Program attempted to validate a number of clinical or organismic tests against success in flying training. Although time did not permit assessment by case conference procedures using all available information, single organismic techniques (e.g., interviews and Rorschach interpretations) were validated and proved to have no predictive value, while a number of single objective tests had validities in the .30s and .40s. In another study a psychiatrist and a psychologist interviewed cadets with borderline test scores and found that their clinical or organismic evaluations were no better than chance in predicting flying success in this group.

Despite their zeal for their procedures, the OSS staff frankly point out their defects ("Sometimes . . . we did not know who was deceiving whom . . ." p. 142) and, if anything, underrate their demonstrated validity. Concerning the validity of the assessment procedure, they state: "the final validity is a question mark" (p. 392). But this point bears consideration.

The validation procedure was made difficult by the scattering of OSS members over the world and by the lack of uniformity in assignments. It was made even more difficult by the fact that no attention had been paid to establishing criteria of success, a natural omission in the pressure of the early days of the war. Despite these and other problems, the average validity for the two principal assessment stations, for a sample of 171 men followed up and rated for job performance overseas by the Overseas Assessment Staff, was .45. There were no control groups to permit a comparison of the effectiveness of these with other methods, but taken by itself this is not a negligible validity coefficient.

A few interesting findings should be cited, to whet the appetites of possible readers. The motives of OSS volunteers were not generally ideological, but largely professional: trained men sought opportunities for worthwhile specialized experiences (p. 247; or do Americans tend to play down their idealistic motives?). Leadership is a relatively general

trait (p. 303). Cultural differences change the nature of situation tests: Chinese candidates ascribe leadership to their friends rather than to leaders (p. 352). Clinical psychologists are better able to diagnose than to predict, many apparent insights into personality being wasted because of lack of knowledge of the prediction situation (p. 430). There is a tendency to overevaluate outgoing persons with egocentric motives and low integrity, emotionally unstable individuals whose manifest behavior is acceptable, and persons of low ability but possessed of goodwill and good social relations (p. 438 ff.). There were no systematic errors of underrating. Assessees gain considerable self-insight in the assessment process (p. 201). Traumatic experiences are common in the backgrounds of normal persons (p. 468).

Suggestions for future work are discussed in the last chapter. Again it may be worth pointing out the parallel with World War I, which brought ex-Army psychologists together in the postwar Scott Company and the Personnel Research Federation. After World War II some of the leading ex-Army psychologists founded the firm of Richardson, Bellows and Henry; a number of ex-Air Force psychologists launched the American Institute for Research; several established ex-Navy psychologists struck out on their own or went into business organizations; and now the final chapter of the OSS book reads almost like a request for a research grant. The Assessment Staff point out the possibilities inherent in their technique for the selection of executives and other key contact personnel (possibilities being capitalized by Selection Boards working with private industry and with government in Great Britain and in Australia), the unusual opportunities which such work affords for studying normal personality structure, and the ease with which assessment procedures such as these lend themselves to the training of junior psychologists in the observation, interpretation, and prediction of human behavior, that is, in the integrative processes with which most psychologists, both laboratory and clinical, have too little experience.

It is to be hoped that some far-sighted business or industrial concern, some foundation, or best of all, perhaps, some combination of the two, will be challenged by the prospect set forth by the Assessment Staff, and that organismic psychologists, both theoretical and applied, will have a real opportunity to develop and exploit the possibilities of their approach. Perhaps there will soon be a country house for psychological houseparties on the North Shore of Long Island or somewhere in Westchester! When the opportunity comes, it is to be hoped that the rules of procedure and recommendations for control and criteria made by the Assessment Staff will be carefully studied. The lessons learned and reported by the Assessment Staff should not have to be relearned by each group of

laboratory and clinical psychologists venturing into the personnel field. At the same time, their original and creative work should add considerably to the tools of the vocational psychologist and should broaden his understandings and deepen his insights. This is a valuable book, worthy of careful study by students of personality and by students of man at work.

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Columbia University

Escalona, Sybylle K. An application of the level of aspiration experiment to the study of personality. *Teach. Coll. Contr. Educ.* No. 937. Pp. viii+132. Cloth $2.10.

A report of the study of the level of aspiration behavior of high school children is presented in this monograph. Although seventy-eight cases were originally studied, this report deals with the comparison of nineteen maladjusted and nineteen well-adjusted subjects. The level of aspiration techniques used were similar to Jucknat's, where the subject selects his task from a series of tasks of graded difficulty placed on a table, but also included a pre-arranged sequence of success and failure experiences such as Gardner used. In addition to the usual level of aspiration scores, decision time and voluntary discontinuation after failure were also measured. The method also included careful interviewing of the subjects following the test procedure.

Two of the interesting quantitative findings were concerned with decision time and voluntary discontinuation. It was found that those in the maladjusted group spent significantly longer time in deciding what task to attempt, and they showed a greater tendency to wish to discontinue the experiment following a failure when given an opportunity to do so. It was also found that those in the maladjusted group were more likely to lower their choices after failure than the subjects in the normal group. In general, the results are interpreted in the topological framework, and a number of stimulating hypotheses are presented.

One major limitation of the study is the small number of cases. A second limitation is concerned with the grouping of cases into maladjusted and well-adjusted. Some of the maladjusted cases were aggressive delinquents, others were withdrawn daydreamers. Part of the author's failure to find consistent results on some measures is probably a function of the heterogeneous nature of her maladjusted group. The author did fractionate her maladjusted group into sub-groups for some measures, but these groups were unfortunately too small to make meaningful, statistical analyses. Other limitations of the method for the study of personality characteristics of individuals were the short number of trials, the method itself which discouraged, although it allowed, a repetition of the same

choice following either success or failure, and the loss of flexibility involved in the prearranged sequence of success and failures. All of these factors tended to limit the study of patterns of response and to provide only a brief sample of the subject's behavior in what might be considered a free-choice situation.

The author concludes that although no one-to-one correlation between personality characteristics and particular responses in the level of aspiration situation can be found, nevertheless, for clinical evaluation the method has many advantages. One such advantage is the opportunity for the direct study of behavior as contrasted with projective methods which involve an additional step of interpretation and consequently a potential, additional source of error.

This is a careful and insightful work, well worth the study of psychologists interested in the utilization of level of aspiration techniques for the clinical or experimental study of personality. Its many fruitful hypotheses should serve as a stimulation for much needed additional research in this field.

Julian B. Rotter

Ohio State University

Goldstein, Naomi F. *The roots of prejudice against the Negro in the United States.* Boston: Boston Univ. Press, 1948. Pp. ix+213. $2.50.

In this book, Dr. Goldstein advances the thesis that present attitudes of prejudice against the Negro in the United States can only be understood in terms of the unique position of the Negro as a former member of a slave class. In developing this point of view, Dr. Goldstein uses an approach that is becoming more and more prevalent among well-trained students of the social sciences. The materials and methods of analysis of history, economics, and sociology, as well as psychology, are brought to bear upon the problem with the happy consequence that this small volume gives a well-rounded picture of the many facets of race prejudice.

The book begins with a brief description of the status of the Negro in the United States today. The concept of race prejudice is then developed as a tendency to react to an individual not primarily as an individual but as a member of a racial group. "In examining a situation to determine the presence or absence of race prejudice, the main criterion is reaction to the group rather than to the individual, any attitude at all which meets this definition must be considered prejudiced" (pp. 34–35). To be free from race prejudice does not, of course, imply that one must ignore any or all "unfavorable" facts relating to the members of a racial group, but rather that these facts, if they exist, must be evaluated in terms of some frame of reference other than racial.

A critical examination of existing theories of race prejudice is then undertaken with the result that the author concludes that no single theory can satisfactorily account for the continued existence of prejudice against the Negro in the United States. Current prejudice can be traced to the institution of slavery, the maintenance of which demanded legal and psychological separation of white and Negro. The traditions, beliefs, customs, and attitudes established at the time of slavery became crystallized in social norms governing Negro and white relations. With the emancipation of the Negro, slavery was no longer legally permissible, but the norms derived from slavery were still in existence and were perpetuated by the legalization of discriminatory and segregative practices. Prejudice and hostility thus continue to exist because of the character of legally supported segregation and discrimination, dating from the period of Reconstruction.

Of interest to many psychologists will be Dr. Goldstein's analysis of the way in which the norms concerning the Negro are expressed in songs, jokes, cartoons, newspaper stories, drama, films, fiction, radio—and even advertisements. This analysis reveals three basic stereotypes: the picture of the Negro as a "contented slave," the picture of the Negro as a "brute barbarian," and the picture of the Negro as a "comic." The latter has been the most pervasive of the stereotypes and embodies all of the beliefs as to why the Negro was happy as a slave and wretched as a freeman—his love of fun, his dependency upon white folks, his childish thinking, his inherent laziness, his few and simple needs, and so forth. These stereotypes have, at all times, served to justify the status of the Negro as a second-class citizen.

The development and perpetuation of a norm which is essentially hostile rather than friendly toward the Negro, Dr. Goldstein believes, is the result of a system of punishments applied to those who refuse to conform to the norm. For a white person to engage in friendly relations with a Negro results in loss of prestige, status, and other social and economic rewards. "Prejudice against the Negro cannot reasonably be expected to disappear until segregation—the *forced isolation* of all members of one group from all members of the other is no longer legally defensible" (p. 120).

Allen L. Edwards

The University of Washington

Kaufmann, Fritz. *Your job.* New York: Harper & Brothers, 1948. Pp. xii+238. $2.75.

Your job, a guide to opportunity and security, is a factual and commonsense treatment of some pertinent facts for the poorly informed individual

in the labor market. Although it is optimistically "written for every worker" and "lay and professional adviser," it is too elementary to benefit such a wide audience. However, it can definitely be read with profit by most entry workers, job explorers, and less experienced counselors and personnel workers. The book might also serve as a supplementary text in college counseling and guidance courses.

Early chapters are devoted to a discussion of elementary self-analysis and a survey of the world of work, while later chapters deal with such topics as wages, personal documents and papers, where to go for information about jobs and job opportunities, and the job interview. There are also helpful sections on training and schooling, the role of labor unions, setting up your own business, and rights and benefits under current social legislation.

Your job is recommended as a book intended for the inexperienced and poorly informed worker and for the fledgling personnel administrator or counselor. There is a little uneveness in coverage of some topics and perhaps several places where we might take exception to the author's emphasis, yet these minor criticisms are more than balanced by the book's merits for this specified audience. It covers crucial aspects of "your job" in an interesting and readable manner. It presents much information that the counselee could profitably read in preparation for a counseling interview. It is based on excellent source material (largely federal and local government publications). It is a realistic discussion of jobs with frank statements about common employer attitudes and suggestions for handling some of these prejudices. It does not overlook the tremendous importance of individual counseling.

As an introductory source book and orientation to the topic of the individual and his job, Kaufmann's book is commendable.

William A. McClelland

Brown University

New Books, Monographs, and Pamphlets

Books, monographs, and pamphlets for listing and possible review should be sent to Donald G. Paterson, Editor, Department of Psychology, University of Minnesota, Minneapolis 14, Minnesota

Selecting the new employee. Paul W. Boynton. New York: Harper and Brothers, 1949. Pp. 136. $2.00.

Personal adjustment in old age. Ruth S. Cavan et al. Chicago: Science Research Associates, Inc., 1949. Pp. 204. $2.95.

Readings in general psychology. Wayne Dennis, Editor. New York: Prentice-Hall, Inc., 1949. Pp. 525. $3.75.

An analytical bibliography of modern language teaching. Edited by Robert Herndon Fife. Washington, D. C.: American Council on Education, 1949. Pp. 549. $5.50.

The validity of commonly employed occupational tests. Edwin E. Ghiselli. Los Angeles: University of California Press, 1949. Pp. 287. $.75.

Psychology for the profession of nursing. Jeanne G. Gilbert and Robert D. Weitz, New York: The Ronald Press Co., 1949. Pp. 275. $3.00.

Man in the primitive world. E. Adamson Hoebel. New York: McGraw-Hill Book Co. Inc., 1949. Pp. 543. $5.00.

Experiments on mass communication. Carl I. Hovland, Arthur A. Lumsdaine, and Fred D. Sheffield. Princeton: Princeton University Press, 1949. Pp. 345. $5.00.

Directed thinking. George Humphrey. New York: Dodd, Mead and Co., 1949. Pp. 229. $3.50.

These are your children. Gladys G. Jenkins, Helen Shacter, and William W. Bauer. Chicago: Scott, Foresman and Co., 1949. Pp. 192. $3.50.

The nature and conditions of learning. Howard L. Kingsley. New York: Prentice-Hall, Inc., 1949. Pp. 579. $4.50.

Frustration. The study of behavior without a goal. Norman R. F. Maier. New York: McGraw-Hill Book Co., Inc., 1949. Pp. 264. $3.50.

Guidance policy and practice. Robert H. Mathewson. New York: Harper and Brothers, 1949. Pp. 294. $3.00.

The psychology of personal adjustment. Second edition. Fred McKinney. New York: John Wiley and Sons, Inc., 1949. Pp. 752. $6.00.

Polls and public opinion. Norman C. Meier and Harold W. Saunders. New York: Henry Holt and Co., 1949. Pp. 400. $3.50 College edition; $4.75 Trade edition.

Psychological testing. James L. Mursell. Second edition. New York: Longmans, Green and Co., 1949. Pp. 488. $4.00.

A manual of pronunciation. Norriss H. Needleman. New York: Barnes and Noble, Inc., 1949. Pp. 323. $4.00.

Child development. Willard C. Olson. Boston: D. C. Heath and Co., 1949. Pp. 432. $4.00.

Biology of mental defect. Lionel S. Penrose. New York: Grune and Stratton, Inc., 1949. Pp. 270. $4.75.

Christianity and fear. Oscar Pfister. New York: The Macmillan Co., 1949. Pp. 589. $6.50.

Effective communication in industry. Paul Pigors. New York: National Association of Manufacturers, 1949. Pp. 88. Copies free upon request.

Experimental psychology. Leo Postman and James P. Egan. New York: Harper and Brothers, 1949. Pp. 500. $4.50.

Opportunities in vocational guidance. Sarah Splaver. New York: Vocational Guidance Manuals, 1949. Pp. 104. $1.00.

Children of Brasstown. Celia Burns Stendler. Urbana: Bureau of Research and Service, College of Education, University of Illinois, 1949. Pp. 103. $.60.

Introduction to Zen Buddhism. Daisetz Teitaro Suzuki. New York: Philosophical Library, 1949. Pp. 136. $3.75.

Adolescent fantasy. Percival M. Symonds. New York: Columbia University Press, 1949. Pp. 397. $6.00.

Experimental psychology. Benton J. Underwood. New York: Appleton-Century-Crofts, Inc., 1949. Pp. 638. $4.50.

Children with mental and physical handicaps. J. E. Wallace Wallin. New York: Prentice-Hall, Inc., 1949. Pp. 576. $5.00.

Advances in insurance coverage—accident prevention and control. New York: American Management Association, 1948. Pp. 39. $.75.

Appraising and training office supervisors. New York: American Management Association, 1948. Pp. 39. $.75.

Building quality into manpower. New York: American Management Association, 1948. Pp. 35. $.75.

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1933	17	1	2	3	4	5	6	$1.25	$6.00
1934	18	1	2	3	4	5	6	$1.25	$6.00
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